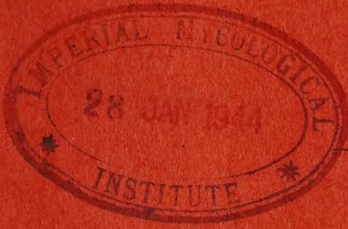


1943.

QUEENSLAND.



**FORTY-THIRD ANNUAL REPORT OF THE BUREAU
OF SUGAR EXPERIMENT STATIONS.**

REPORT OF THE DIRECTOR

TO

THE HON. THE SECRETARY FOR AGRICULTURE AND STOCK

(As required by "The Sugar Experiment Stations Acts, 1900 to 1941").

PRESENTED TO PARLIAMENT BY COMMAND.

BRISBANE:

BY AUTHORITY: A. H. TUCKER, GOVERNMENT PRINTER,

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A. 31—1943.

FORTY-THIRD ANNUAL REPORT OF THE BUREAU OF SUGAR EXPERIMENT STATIONS.

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK.

SIR,—I have the honour to submit the Forty-third Annual Report of The Bureau of Sugar Experiment Stations, covering the period 1st July, 1942, to 30th June, 1943.

ARTHUR F. BELL,
Acting Director.

Brisbane, 31st August, 1943.

Director's Report.

General.

The sugar industry is now engaged upon the harvesting of its fifth wartime crop, crushing having been commenced by Northern mills on 12th June. The season has started inauspiciously, and ahead lie many difficulties which will try the skill, patience, and pertinacity of all concerned with the production of this staple food.

In common with the previous two seasons, the year has been one of climatic extremes—but this time in the reverse order. Following a slow start for the crop, due to late planting and a protracted winter, the spring was generally most favourable, and had labour and fertilizer supplies been normal a bumper crop would have been in sight at the end of 1942. However, following very heavy precipitations in December and February, the monsoonal rainy season ceased early and abruptly, and since March conditions have been abnormally dry throughout the State.

Cultivation has been quite inadequate in most districts, while fertiliser applications were both deficient and late. Grub damage was unusually severe in northern districts and, owing to shortages of fumigant, and the labour for its injection into the soil, the necessary preventive measures could not be taken. Finally, heavy and prolonged frosts in the southern districts, coupled with the promise of a very low crushing rate, have still further added to the list of adverse factors.

Estimate of the 1943 Crop.

The preliminary estimate of the 1943 crop, made in May, was that 3,989,988 tons of cane will be available for crushing; conditions prevailing since the making of the estimate have been such that there is no reason to suggest that it might be exceeded. This will be the smallest crop harvested for many years, and is 550,000 tons less than the estimated 1942 crop and 360,000 tons less than the crop actually milled last year. In view of the low tonnage available it is likely that growers will endeavour to harvest all available cane, provided the decreased crushing rates permit its treatment.

It appears likely that a considerable number of mills will be unable to crush more than two shifts; this will naturally prolong the season and reduce efficiency. Moreover, a large area of cane has been frosted in the southern mill areas, while climatic conditions generally have been unfavourable since the estimate was made. In these circumstances, it is probable that the output of 94 net titre sugar will not exceed 550,000 tons during the 1943 season.

The accompanying table compares the crushings of individual mills during the 1942 season and the anticipated crops for 1943. Attention is drawn to the presentation of two series of tonnages, representing "actual" and "domestic" crushings, for each mill during 1942. The necessity for this differentiation lies in the fact that, in order to reduce rail transport to a minimum cane was crushed at the nearest mill to which it could conveniently be delivered. In consequence, any one mill may have crushed cane belonging to the suppliers from several mill areas. The domestic crushing therefore represents the tonnage of cane which would have been crushed at each mill in the absence of transport restrictions; it is this figure which should be compared with the estimates submitted in last year's report.

CROP HARVESTED, 1942—CROP ESTIMATED, 1943.

1942 Crop.		Mill.	1943 Estimate (Preliminary).
Domestic Crushing.	Actual Crushing.		
102,033	102,033	Mossman	105,000
175,198	175,198	Hambledon	180,000
200,677	199,616	Mulgrave	215,000
214,351	214,561	Babinda	182,000
194,561	195,412	Goondi	162,500
236,891	238,673	South Johnstone	190,000
164,614	162,832	Mourilyan	135,000
240,042	240,042	Tully	200,000
229,871	233,103	Victoria	156,000
204,836	201,705	Macknade	120,000
80,834	80,733	Invicta	70,000
175,763	175,763	Pioneer	108,420
180,100	180,100	Kalamia	136,000
215,426	215,426	Inkerman	162,500
134,607	136,887	Proserpine	130,000
67,233	69,329	Cattle Creek	62,975
150,619	157,382	Racecourse	130,000
131,791	140,180	Farleigh	130,000
78,466	78,405	North Eton	70,000
140,054	139,924	Marian	105,000
141,425	122,088	Pleystowe	130,000
135,759	135,759	Plane Creek	115,000
76,346	76,346	Qunaba	76,000
136,035	135,107	Millaquin	154,000
140,566	133,381	Bingera	145,000
115,120	105,221	Fairymead	151,404
14,859	22,056	Gin Gin	45,000
99,966	110,217	Isis	204,189
49,685	50,285	Maryborough	56,000
16,737	16,701	Mount Bauple	40,000
95,181	95,181	Moreton	111,000
10,671	10,996	Rocky Point	10,000
325	..	Eagleby	2,000
4,350,642	4,350,642	33 Mills	3,989,988

Statistics of 1942 Crop.

The 1942 season production of raw sugar in Queensland, including "local sales" of 315 tons, was 605,596 tons on the 94 net titre basis. This yield was 91,750 tons lower than that produced in 1941, some 286,000 tons below the record established in 1939, and the lowest production since 1932. The ratio tons cane per ton sugar was also unusually high, being 7.18.

The following table sets out the distribution of production between the areas north and south of Townsville during the past five seasons:—

SUGAR PRODUCTION, 1938-42.

District.	1938.	1939.	1940.	1941.	*1942.
	Tons.	Tons.	Tons.	Tons.	Tons.
North of Townsville ..	328,301	351,267	309,437	305,819	264,129
South of Townsville ..	449,835	540,155	450,009	391,526	341,486
Total ..	778,136	891,422	759,446	697,345	605,596

* Storage loss of 19 tons not yet allocated to mills.

Yields have declined rather more rapidly south of Townsville, where the crop was the smallest since 1934; the northern crop was the lightest since 1936.

The area harvested for milling purposes was 238,213 acres, a decrease of 8,726 acres, or 3.5 per cent. on the 1941 figures. This area was divided between plant, ratoon, and standover cane as under:—

	Acres.
Plant cane	88,903
Ratoon cane	126,437
Standover cane	18,857
Moreton Mill (not dissected)	4,016
Total	238,213

The yield of cane per acre harvested for crushing purposes was 18.26 tons, and of sugar 2.54 tons, compared with 19.42 and 2.82 in 1941. Details of yields in the several major districts of the State are given below. With the exception of Moreton all districts recorded a yield of sugar lower than the ten-year average.

TABLE SHOWING DETAILS OF DISPOSAL OF MOLASSES FOR THE TEN-YEAR PERIOD 1933-1942.

Method of Usage.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.*	1942.*
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Distilleries ..	4,107,566	4,573,037	4,617,431	6,086,864	7,071,109	8,275,887	9,581,241	11,531,396	9,996,390	6,862,390
Fertilizer ..	1,793,101	2,227,905	2,559,528	3,211,423	3,363,624	3,293,543	4,295,289	3,334,372	1,499,250	1,553,710
Stock Feed ..	2,902,188	3,035,598	3,817,755	4,351,822	3,914,113	4,237,196	4,727,170	5,380,242	2,827,350	2,625,428
Mill Fuel ..	7,348,015	5,339,489	4,103,475	6,354,841	5,576,764	3,748,590	3,834,653	1,781,425	1,152,134	2,734,330
Other Purposes ..	340,928	444,680	175,519	397,080	157,496	232,049	188,589	228,450	125,552	411,362
To Waste ..	1,747,365	1,162,715	1,214,678	560,326	466,481	498,926	457,541	47,069	10,310	47,271
Total ..	18,239,163	16,783,424	16,488,386	20,962,356	20,549,587	20,286,191	23,084,783	22,302,954	15,610,986	14,234,491

*Bureau figures; others obtained from the Government Statistician.

1942 Sugar Values.

The 1942 sugar production was worth £11,515,000 to the State; information as to the proportion of this crop exported is withheld for security reasons. The average price for domestic consumption sugar, after payment of rebates, &c., was £22 14s. 6d. The average price for No. 1 Pool sugar reached the very satisfactory level of £19 1s. per ton, while the average price for all sugar was £19 0s. 5d. per ton. As this high price for No. 1 Pool sugar is due to the small crop it naturally follows that there has also been an increase in unit cost of production. Only two mills, Pioneer and Inkerman, exceeded their mill peak tonnage allocations, and produced an aggregate of 2,064 tons of "excess" sugar.

The price for No. 1 Pool sugar having exceeded £19 per ton, the five small mills designated by the 1939 Royal Commission were not eligible for the bonus of £1 5s. per ton of sugar previously paid.

Economic Review.

The 1942 season opened in a period of uncertainty and insecurity, engendered by Japan's entry into the war as an active Axis partner, and its subsequent rapid and successful

ACREAGE YIELDS BY DISTRICT.

District.	Tons Cane per Acre.	Tons 94 n.t. Sugar per Acre.
Mossman-Ingham	20.3	2.73
Lower Burdekin	23.2	3.53
Proserpine	18.4	2.03
Mackay-St. Lawrence	13.4	1.92
Bundaberg-Gin Gin	19.7	2.71
Childers-Maryborough-Gympie	15.1	1.93
Nambour-Beenleigh	23.0	3.00
State Average	18.26	2.54

Crop statistics for the whole State over the past ten years are subjoined. The general downward trend as a result of wartime conditions may be readily seen.

TABLE SHOWING ACRES CULTIVATED AND HARVESTED, YIELDS OF CANE AND SUGAR, ACRE-YIELDS, AND QUALITY OF CANE, 1933-1942.

Year.	Acres Cultivated.	Acres Harvested.	Total Yields.		Yields per Acre.		Tons Cane to 1 ton Sugar.
			Cane.	Sugar.	Cane.	Sugar.	
			Tons.	Tons.	Tons.	Tons.	Tons.
1933 ..	311,910	228,154	4,667,023	638,734	20.46	2.80	7.31
1934 ..	303,916	218,426	4,269,991	612,570	19.56	2.80	6.97
1935 ..	314,700	228,515	4,220,267	610,326	18.47	2.67	6.82
1936 ..	338,686	245,152	5,171,516	744,261	21.10	3.04	6.94
1937 ..	348,840	249,683	5,132,934	763,325	20.56	3.06	6.73
1938 ..	347,199	251,064	5,342,085	778,136	21.28	3.10	6.87
1939 ..	353,996	261,047	6,038,821	891,422	23.14	3.41	6.77
1940 ..	350,851	265,738	5,180,756	759,446	19.50	2.86	6.82
1941 ..	334,787	246,937	4,793,589	697,345	19.41	2.82	6.87
1942 ..	316,798	238,213	4,350,487	605,596	18.26	2.54	7.18
True Average for 10 years ..	332,168	243,293	4,916,747	710,118	20.21	2.92	6.92

Distilleries continued to acquire the major part of the molasses produced, but transport difficulties have lately militated against this method of disposal and also against the use of molasses as a stock food. It may appear anomalous at first sight that the use of molasses as a fertilizer has declined in a time of acute fertilizer shortage; however, this is readily explained by labour and road transport difficulties, and particularly the shortage of petrol and tyres. On the other hand, lost time and reduced crushing rates, involving less efficient use of fuel, have caused a larger proportion to be burnt in the mill furnaces as a supplementary fuel; it is to be expected that this will be still more pronounced during the 1943 season. Details of molasses production and disposal over the past ten years are—

drive across the South-West Pacific. The sugar industry, and the towns and districts directly dependent upon it, had already given ungrudgingly of their best in manpower and resources. This, and its geographic position, made it inevitable that the sugar industry should be particularly affected by the increased and exigent demands of the new war situation.

An acute shortage of field labour, and particularly of cane-cutters, developed. The lack of cutters was to some extent compensated by farmers cutting a greater proportion of their own cane, but naturally this could only be done at the expense of cultivation of already neglected young crops. The mills, by virtue of their employment of older men, were rather better placed as regards labour and could have treated the cane more rapidly had the supplies been available. Crushing rates dropped some 12 per cent. when compared with the 1941 rates, and it is estimated that the average mill crushed at very little more than 80 per cent. capacity; while some few mills were scarcely affected, others were able to achieve only the equivalent of a two-shift crushing.

In the field, in spite of strenuous efforts on the part of canegrowers and their families, the standard and timeliness of cultivation left much to be desired. The field labour shortage

was accentuated by the impressment of heavier-type tractors for use on works of military importance. This was particularly the case in the districts north of Townsville—due to their proximity to the war zone and their greater proportion of heavy tractors; it is estimated that about 20 per cent. of the effective tractor power was impressed there.

Transport of cane and sugar was attended by great difficulty, particularly in those areas where considerable use is normally made of Government railways for the transport of cane. At the instance of the Chairman of the Central Cane Prices Board, transport committees were set up in each centre, and in consultation with the Railway Department directed railway-hauled cane to the nearest or most convenient mill, irrespective of whether the land growing that cane was assigned to that particular mill or not. Mutual arrangements were made between millers regarding payment for cane and reimbursement of milling costs. Co-operation was excellent and the scheme worked very well and greatly relieved the rail transport position.

The mills were enabled to cope with slow transport of manufactured sugar by the extension of storage facilities to the limit of their ability. Although the position was precarious at times no actual loss of crushing time resulted from lack of storage space.

Rationing of sugar was introduced throughout Australia on 31st August, 1942, in order to conserve stocks, maintain overseas commitments, and relieve transport and manpower difficulties. Pre-rationing consumption of sugar, excluding that used in manufacture, was about 24 ounces per person per week. The proclaimed personal ration of 16 ounces per person per week, plus allowances for jam-making, is therefore very liberal and has imposed no real hardship on the consumer; it compares most favourably with the ration received in overseas countries. It is very satisfactory to the industry to know that the Commonwealth Government has undertaken that the sugar-producer will not suffer monetary loss arising from reduced domestic consumption consequent upon rationing.

The introduction of a scheme of fertilizer rationing within the sugar industry was recorded in last year's report. Within the limits imposed by restricted supplies of fertilizer, the sudden changes in quantities allotted to the State, and difficult intra- and inter-state transport, the scheme has worked satisfactorily during the period under review. In order to meet the changed conditions which have developed since the scheme was launched some modifications will be made in the basis of rationing for the next fertilizer year.

It has been announced through the Press that the Australian sugar industry has been allotted a production target of 600,000 tons of sugar. If this be correct, and assuming that the target is stated in terms of bagged sugar, a State production of some 587,000 tons of 94 net titre sugar will be required. Unless seasonal conditions are particularly good this goal will not be reached on the present indications of fertilizer deliveries.

The Royal Commission.

In view of the difficulties encountered during the 1942 season the State Government very wisely appointed a Royal Commission to enquire into the immediate problems of the sugar industry and to make recommendations for their treatment. The Commission, under the chairmanship of Mr. Justice Mansfield, visited all sugar districts and examined 137 witnesses, and submitted its report to the Honourable the Premier on 8th February, 1942. In order to assist the industry the better to meet its most pressing and serious problems, but having due regard for national commitments, the Commission recommended, *inter alia*—

That the sugar industry be allotted sufficient harvesting labour to enable all mills to crush at a weekly rate equal to 75 per cent. of their maximum average seasonal weekly crushing rate;

That a central committee consisting of representatives of growers, millers, and the Australian Workers' Union be set up in Brisbane to advise manpower authorities so as to achieve an equitable distribution of labour to mill areas;

That harvesting committees be constituted in each mill area for the purpose of controlling size of harvesting gangs and their transfer from one cut to another;

That cane-cutters be engaged only with the sanction of the manpower authorities;

That in central and southern areas (where group harvesting was not usual) the Local Cane Prices Boards appoint tribunals to arrange grouping where practicable;

That encouragement be given to the development and manufacture of mechanical harvesting and loading equipment;

That every effort be made to provide an adequate and equitable distribution of fertilizers;

That existing organisations within the industry continue to function as at present.

The recommendations of the Commission were accepted by the State Government, which immediately took such consequential action as came within the scope of its authorities, and transmitted the remaining recommendations to the Commonwealth Government for consideration. At the time of writing, the Commission's submission regarding manpower has not been fully implemented by the manpower authorities, resulting in the unsatisfactory crushing rate referred to elsewhere in this report.

Future Sugar Production.

The outlook for the immediate future of the Queensland sugar industry must cause deep concern among those directly associated with it, and I deem it incumbent upon me to direct attention to the continued serious decline in production, and deterioration of the industry.

The graph reproduced in Figure 1, and the figures set out in the accompanying table, indicate the sharp downward trend of production since 1939. It will be seen that the quantity of sugar manufactured has dropped from the peak of 891,422 tons in 1939 to an estimated crop of 550,000 tons for the current season, and that the rate of decline in production shows no marked signs of falling off. While the area harvested has also decreased, the rate of decline is much less than that of production, and it is obvious that factors other than reduced acreages are contributing to the lower production. It must be concluded that deficiencies in available field labour and fertilizer both play an important part in this decline.

TABLE SHOWING RELATION OF PRODUCTION TO AREA HARVESTED AND FERTILIZER SALES FOR THE YEARS 1936-1943. (See also Figure 1.)

Season.	Tons Sugar Made.	Acres Harvested.	Tons Sugar Per Acre.	†Tons Fertilizer.
1936	744,261	245,152	3.04	45,000
1937	763,325	249,683	3.06	50,000
1938	773,136	251,064	3.10	56,000
1939	891,422	261,047	3.41	61,000
1940	759,446	265,733	2.86	59,000
1941	697,440	248,939	2.82	54,000
1942	605,596	238,213	2.55	35,000
1943	*550,000	..	..	15,000

* Estimate.

† Approximate sales for previous year; the effect of fertilizer is seen in the crop harvested the year following its purchase and application.

For the purposes of comparison we have determined and included in the data the quantity of fertilizer purchased by canegrowers each year and have related these tonnages to the crop which they helped to produce for the following season. It will be seen that the average application of 55,000-60,000 tons dropped sharply to 35,000 tons for the 1942 crop and 15,000 tons for the 1943 crop. Nor is this the whole story: The level of plantfood constituents was considerably lower in the fertilizer applied to the 1943 crop and, due to transport difficulties, delayed or late application was frequent.

Sugar-cane is a perennial plant and under Queensland practice three or four crops are cut from each planting. The weight of the cane produced in a field in any one year is to very considerable extent dependent upon the size of the individual plants which contributed the previous crop. That is to say, if for any reason the component plants are below normal size then this stunting will persist and will adversely affect the size of subsequent ratoon crops—even though the latter be grown under the most favourable conditions. The ill-effects of inadequate fertilizer and cultivation are therefore permanent and complete restoration of normal crops cannot be attained until several years after resumption of normal cultivation and fertilizer practices.

As indicated above the detrimental effects of current late and reduced applications of fertilizer will be operative at least until 1946, even assuming that adequate and timely supplies of fertilizer are available from now onwards. However, although the Commonwealth Government allocations of fertilizer for the 1944 crop show an improvement in quantity and quality, transport has become even more difficult to obtain and deliveries have been most unsatisfactory to date. At the time of writing there are no indications that deliveries will even be equal to last year's, and already they are overdue.

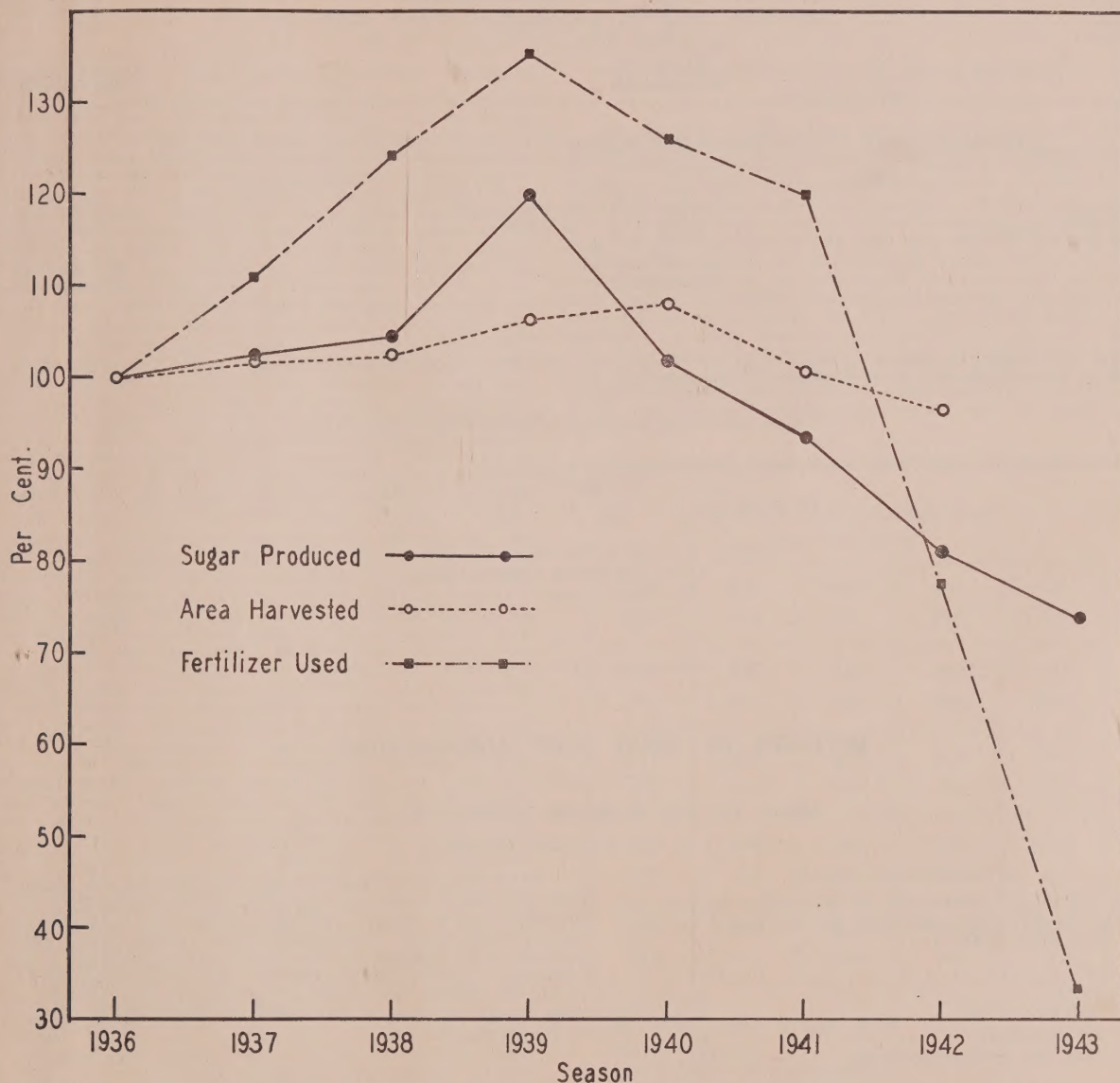
The already intense transport difficulties are accentuated by the sulphate of ammonia-nitrate of soda position. Prior to the war the Queensland sugar industry absorbed half the sulphate of ammonia imported into or manufactured in Australia; but since the cessation of imports of this commodity Australian production has not been divided *pro rata*, and the sugar industry has been required to take such nitrogenous fertilizer as is available in the form of nitrate of soda. Were a proportion of Australian produced sulphate of ammonia made available it could be transported northwards in relatively small

quantities continuously throughout the year; in such circumstances the greatly attenuated transport and storage facilities in North Queensland could cope with the situation reasonably well. Moreover, this fertilizer could be stored through the monsoonal wet season, which is not practicable with nitrate of soda. The quantity of nitrate of soda which the industry can accept is limited by the fact that it necessarily arrives from overseas in a very few large shipments, and in present circumstances the concentrated quantity of land transport required for the rapid disposal of large quantities just simply cannot be provided at North Queensland ports. It is also worthy of note that nitrate of soda has 25 per cent. more bulk than sulphate of ammonia, thus increasing the transport problem.

The high development of mechanisation in canegrowing, and the extensive use of rubber-tired tractors and trucks, has placed the industry at considerable disadvantage in the present crisis, and the problem of spare parts for farm machinery is acute and serious. The already depleted fleet of tractors could be used to much greater advantage if better arrangements for the supply of spare parts prevailed.

Unless transport facilities are improved, more first-class labour released, and a greater quantity of more suitable fertilizer and machinery spare parts provided, production of sugar in Queensland will continue to reach progressively lower levels.

FIG. 1.—Showing the relation of fertilizer applied, and acres harvested, to the production of sugar in Queensland from 1936 to 1943 (see Table on page 4).



Work of the Bureau.

Reports of the several officers supervising the activities of sections and regional stations will be found in the following pages. These reports have been restricted in volume by the necessity for general economy in newsprint, while the shortage of staff has reduced investigational work to the bare immediate essentials. Efforts have been directed towards the maintenance of an advisory service as extensive as possible, while assistance has also been rendered to Australian and Allied Services.

Two meetings of the Advisory Board were held, on 12th August, 1942, and 30th March, 1943. The passage of the year witnessed marked changes in the personnel of the Board. Mr. F. W. Bulcock, who sponsored the legislation which constituted the Board and who had been Chairman since its inception, resigned from the State Ministry to become Commonwealth Director-General of Agriculture. Mr. N. H. Wellard (Deputy Chairman and growers' representative) resigned recently after seven years' service. Mr. John Smith (millers' representative)

has resigned on account of his departure from the State; Mr. Smith was also one of the original members of the Board and played an important part in its successful inauguration. The experience and counsels of these gentlemen will be greatly missed; their places have been taken by the Hon. T. L. Williams (Secretary for Agriculture), Mr. J. A. Winter (Tully), and Mr. J. W. Inverarity (Kalamia). During the year the Board dealt with routine matters of administration and policy and also drafted and promulgated the powers and duties of each of the Cane Pest and Disease Control Boards constituted under the Sugar Experiment Stations Act. The position of these Boards and the scope of their activities are now clearly defined.

The staff of the Bureau has been still further depleted by the call of various national services. In January, Dr. H. W. Kerr was seconded to the staff of the Controller of Defence Foodstuffs where he is now engaged in the highly important work of devising and supervising standards of food processing. Mr. W. A. McDougall is at present assisting the Australian

Wheat Board in wartime wheat storage problems, while the writer is mainly engaged on special duties for the Public Service Commissioner. Twelve staff members are in the fighting forces, and a further four members are engaged on special work in Commonwealth Government Departments.

Much of the time of several members of the staff has been devoted to the implementing of the fertilizer rationing scheme. The scheme is now approaching the end of its second year of

operation and is generally accepted as an equitable method of distribution of available supplies. All farms have been classified individually and rations are allotted accordingly.

Owing to war conditions no field days were held at the Experiment Stations, and no attempt was made to hold the Tractor and Agriculture School at Gatton. The conference of the Queensland Society of Sugar-cane Technologists was likewise postponed.

**"THE SUGAR EXPERIMENT STATIONS ACTS, 1900-1941."
SUGAR FUND.**

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM 1ST JULY, 1942, TO 30TH JUNE, 1943.

RECEIPTS.				DISBURSEMENTS.			
		£	s. d.			£	s. d.
To Balance		28,435	19 3	By Salaries		7,829	19 3
" Assessments		9,064	11 9	" Contingencies		4,347	14 1
" Endowment		7,000	0 0	" Bundaberg Contingencies		1,253	8 5
" Bundaberg		865	9 10	" Mackay Contingencies		1,189	17 9
" Mackay		797	13 0	" Meringa Contingencies		1,459	16 11
" Meringa		1,240	4 11	" Balance		31,390	4 5
" Sundries		66	17 1				
		<u>£47,470</u>	<u>15 10</u>			<u>£47,470</u>	<u>15 10</u>

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM INCEPTION OF FUND, 1ST DECEMBER, 1900, TO 30TH JUNE, 1943.

RECEIPTS.				DISBURSEMENTS.			
		£	s. d.			£	s. d.
To Assessments		309,194	18 5	By Disbursements		567,506	12 4
" Endowment		227,199	1 7	" Balance		31,390	4 5
" Sugar Experiment Stations		62,502	16 9				
		<u>£598,896</u>	<u>16 9</u>			<u>£598,896</u>	<u>16 9</u>

C.C.S. FORMULA.

For the benefit of readers of this report we would point out that the measure of available sugar in cane (so-called Commercial Cane Sugar or C.C.S.) is given by the equation:—

$$\text{C.C.S. in cane} = \text{Pol in cane} - \frac{\text{Soluble Impurities in Cane}}{2}$$

In practice per cent. C.C.S. is calculated by the empirical formula:—

$$\text{C.C.S.} = \frac{3P}{2} \left(1 - \frac{5 + F}{100} \right) - \frac{B}{2} \left(1 - \frac{3 + F}{100} \right)$$

where— P = pol in first expressed juice
B = brix in first expressed juice
F = fibre in cane.

DIVISION OF SOILS AND AGRICULTURE.

WORK OF THE BRISBANE LABORATORY.

MR. C. R. VON STIEGLITZ, Chemist.

ANALYTICAL WORK.

The following is a summary of the routine analyses performed at the Brisbane Laboratory for the period 1st July, 1942, to 30th June, 1943:—

Soils	144
Waters	6
Basic Lead Acetate	4
Mill By-products	3
Media, &c., for Pathology Division	10
Total	<u>167</u>

In addition to the above, 266 samples of various materials have been analysed for our own or United States services. Owing to the vast array of materials used by the services in one way or other, it is not surprising that samples for analysis have differed very considerably in type and composition. This has prevented any detailed planning for the efficient handling of such samples, as the analyst may have to concentrate on foods analysis one week, and on alloys the next. It is felt that the Bureau has already rendered a definite service to the war effort in analysing these substances, but much more could be done if the spasmodic nature of the work were eliminated.

The number of soil samples submitted for routine analysis by farmers with a view to obtaining advice as to the correct fertilizer to apply has again dropped considerably. Two factors have contributed to this sudden drop: (a) The depletion of our field staff to two officers, and (b) the shortage of fertilizer, which prevents farmers from making their usual purchases.

Many farmers feel that the results of analyses will benefit them but little whilst their power to obtain fertilizer is so limited. This is partly true, but farmers may still obtain valuable information as the result of soil analyses when these analyses show distinct fertility gradients between fields, as frequently happens. Such results give the farmer information which will enable him to make the most economical use of those meagre supplies of fertilizer which are available to him at the present time.

INVESTIGATIONAL WORK.

Soil Fertility Survey, Garradunga Area.—In collaboration with Mr. Knust, Instructor in Sugar-cane Culture, it has been possible to continue this work commenced in 1940 and which, with the exception of a few fields to be sampled after this harvest, is now completed. Coloured maps have been compiled showing the variations of soil fertility on the various farms. Whilst the area mentioned is normally one which is potash deficient, the survey has shown very definitely that many of these soils are also deficient in phosphoric acid. Such knowledge has enabled the farmers to modify their customary fertilizer programme with most beneficial results. It is intended this year to commence another fertility survey of an area near Mourilyan which is known to contain soils of a variable nature. The results of this survey will eventually be mapped similarly to the Garradunga area.

Monthly Variations of Available Plantfoods and pH in Certain Selected Soils.—This study, which was commenced in 1940, has continued during the past year. The samples, representing five different soil types from three districts varying greatly in climate, were taken at depths of 0 inch to 10 inches

and 10 inches to 20 inches. Sampling of several of the blocks in the Innisfail area will cease after this harvest, as these are on private property and the customary growth cycle finishes with this year. Sampling of the others will continue, but the block at Bundaberg Experiment Station will only be examined every two months in future.

Information obtained to date:—

(1) *Reaction.*—Values generally do not show a great variation from month to month. The soils from both Mackay Experiment Station and Bundaberg Experiment Station show a slight tendency to become more acid; the others remain practically constant.

(2) *Available Phosphate.*—All types, with the exception of the red volcanic soil from Innisfail district, show variations from month to month, above or below a fairly constant value.

NORTHERN SUGAR EXPERIMENT STATION, MERINGA.

MR. R. W. MUNGOMERY, Officer in Charge.

METEOROLOGICAL AND NOTES ON CROP GROWTH.

Because of the late rains that extended well into the winter months of 1942, there was adequate soil moisture for the spring plantings, and since temperatures were also favourable germinations were quite satisfactory despite the dry weather experienced from July until late in September. As a result of labour shortages during the harvesting season, plantings were in many cases unduly protracted. Had adverse weather conditions been experienced at this time the effect on germination would have been serious, but, fortunately, some good falls of rain occurred in late September, and these provided the necessary soil moisture to give both plant and ratoon crops an excellent start. The showers that fell during the next few months were not heavy, but they were nicely spaced, and their yield was sufficient to maintain the crops in good growth until December, when continuous thunderstorms throughout the month, yielding over 18 inches of rain, served to maintain most crops in a very vigorous state of growth. Although this December rainfall was most timely for the more advanced crops, it did not, on the other hand, allow of normal cultivation during a period when weed growth was at a maximum; hence some of the later planted fields and late ratoon blocks became neglected and badly choked with grasses and weeds, and several fields did not recover from this initial disadvantage.

Thereafter, January was relatively dry and hot, but the crops' previous progress was interrupted only towards the end of the month, when the dry conditions began to be felt. However, this setback was only of short duration, and vigorous growth was again resumed in February with its alternating storms and sunshine, followed later by monsoonal rains, when over 26 inches were registered. At that time crop prospects looked particularly bright, but from then onwards there was a rapid deterioration in the general crop outlook, and what in the first instance promised to be a good crop ultimately turned out to be a poor one. Dry conditions set in during March, and continued for the remainder of the season, and growth practically ceased. Deficiencies in fertilizer application, and in some instances the complete lack of fertilizer, no doubt contributed in some degree to the sudden cessation of growth, whilst in April it became apparent that the degree of arrowing in most varieties would be considerable, thus cutting down further on the tonnages originally estimated. In addition, cane grubs made inroads into the crops and caused appreciable losses in many areas, though crops on the Experiment Station did not suffer in this respect. Losses through grubs were aggravated by the dry conditions operating after April, and even light infestations were able to exert a profound effect on most crops, whilst manpower shortage added its quota to the losses by virtue of the fact that insufficient labour was available to fumigate infested fields.

Though the wet season rains were not of long duration and influenced considerably the crop to be harvested in 1943, they were not without their favourable effect on the autumn plantings for the 1944 crop. By the sudden cessation of these rains growers were able to prepare their land earlier than would otherwise have been the case, and accordingly a considerable amount of early planting was made possible. Plantings were able to be extended over a longer period, and in some cases growers were able to get the major portion of their plantings completed before the commencement of harvesting operations, and this overcame to a large extent some of the difficulties connected with labour shortages.

The following are the rainfall records taken at this Experiment Station during the past twenty years:—

Year.	Rainfall in Inches.	Year.	Rainfall in Inches.
1923	53.29	1934	91.44
1924	95.47	1935	59.91
1925	76.98	1936	88.81
1926	59.12	1937	46.33
1927	90.16	1938	55.86
1928	66.33	1939	118.08
1929	102.28	1940	84.58
1930	107.61	1941	84.65
1931	98.82	1942	60.14
1932	76.31	1943 (6 months)	40.44
1933	96.06	Average 27 years	81.07

Values for the red volcanic soil mentioned above, however, show a gradual decline. This is interesting in view of the results from the Garradunga survey, which demonstrated the urgent need for phosphate fertilization on many of the farms of red volcanic soil in this area.

(3) *Replaceable Potash.*—The acid alluvial soil from the Innisfail district varies but little in values throughout the entire period, but appreciable variation takes place in the values of the other types; the general trend, however, is for the low values to occur in the winter time, and correspondingly high values in summer. These results suggest that temperature and moisture play a big part in the release of potash in a replaceable form from the soil complex. It is hoped to investigate this phase of the problem more thoroughly in the coming year.

MODIFICATION OF USUAL EXPERIMENTAL PROCEDURE.

On account of the serious position developing last year concerning food production for both the civilian population and the ever-increasing number of Allied troops in Australia and neighbouring islands, it was decided as a matter of policy that this Experiment Station should give a lead in vegetable productions (to which reference is made in another section), and accordingly the major portion of the usual cane-planting programme was abandoned. Only one observational varietal trial of third-year seedlings was set out in the fields, and promising varieties were further propagated. However, in order to keep up the cane tonnage to a figure somewhat approaching normal, a departure was made from our usual practice of ploughing out after harvesting the plant crops of both original and second-year seedlings, and in this instance they were ratooned. This wartime expediency is expected to yield valuable information which may greatly influence our future policy of selecting seedling canes.

The following trials were harvested during the past season:—

VARIETY TRIAL (Plant Crop).

PLAN AND YIELDS.

K.58	Q.10	Comus	Cato	Q.44
30.0	31.9	37.1	37.9	39.8
Comus	Cato	Q.44	Q.10	K.58
38.6	40.7	42.1	35.3	35.7
Q.44	Comus	Q.10	K.58	Cato
34.4	35.7	27.4	33.9	36.6
Q.10	K.58	Cato	Q.44	Comus
33.9	40.2	40.2	38.2	36.1
Cat	Q.44	K.58	Comus	Q.10
30.2	43.7	38.3	42.8	29.2

Block.—A3.

Harvested.—Early August, 1942.

Plots.—0.05 acre.

Age of Crop.—Fourteen months.

Plan.—5 x 5 Latin Square.

SUMMARY OF YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per Cent.
Q.44	39.7	14.7
Comus	38.1	14.9
Cato	37.1	14.6
K.58	35.7	13.2
Q.10 (standard)	31.5	15.4

DISCUSSION.

Following the ploughing under of an excellent Poona pea crop in the autumn, plantings were delayed on account of excess moisture, and finally the trial was planted early in June, 1941. Sugar Bureau No. 2 planting mixture was applied in the drills before planting at the rate of 4 cwt. per acre. Comus, Q.44, and Q.10 were the quickest to strike, whilst Cato was more tardy, and K.58 definitely slow in coming away. Growth in

this trial was more uniform than in adjacent fields, but most progress was made following the autumn rains. Q.44 and Comus were always taller than the remaining varieties, and looked to be heavy croppers, though the latter does not always yield to expectations. Cato, on the other hand, appeared to be yielding a smaller crop, but when the plots were finally weighed they cut out surprisingly heavy. Plot weights showed little difference between the three varieties—Q.44, Comus, and Cato—and their ratoon crops will be further watched with interest. All three were significantly superior to the standard Q.10, and these varieties are now on the list of approved canes. The low quality of K.58 and its slow and uncertain germination will definitely rule out any further consideration of this variety.

OBSERVATIONAL VARIETAL TRIAL (Plant Crop).
PLAN AND YIELDS.

A.255 37.3	A.205 36.0	A.210 27.5
Q 13 34.4	K.95 28.0	Q.13 28.5
A.280 40.5	A.207 42.7	A.243 29.1
A.220 33.2	Q.13 43.8	A.253 39.0
A.278 39.2	A.263 39.5	N.G.15 27.0
Q.13 38.5	Q.46 29.6	Q.13 35.0
A.247 36.4	A.228 45.1	A.233 42.6
A.224 37.0	Q.13 43.3	A.232 27.6
Q.25 42.1	Atlas 46.0	A.229 30.4

Block.—A4.
Harvested.—July, 1942.
Age of Crop.—Eleven and a-half months.
Plots.—0.04 acre.

SUMMARY OF CROP YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per Cent.
A.205	36.0	9.8
A.207	42.7	10.1
A.210	27.5	13.4
A.220	33.2	9.9
A.224	37.0	12.6
A.228	45.1	10.4
A.229	30.4	10.6
A.232	27.6	13.8
A.233	42.6	9.5
A.243	29.1	11.8
A.247	36.4	11.8
A.253	39.0	13.1
A.263	39.5	12.7
A.278	39.2	11.9
A.280	40.5	10.1
K.95	28.0	13.2
Atlas	46.0	10.4
N.G.15	27.0	13.5
Q.25	42.1	11.4
Q.46	29.6	14.7
Q.13 average of 6 plots ..	37.2	12.9

DISCUSSION.

Prior to the planting of this trial, a good legume crop was ploughed in, and the land was in excellent order when planted early in August. Germinations were rapid and good, and the varieties made very satisfactory progress until dry weather limited their growth during the summer months. Growth was resumed during autumn, when the crop made up much of the leeway, and the varieties were still in vigorous growth and immature when, as a matter of expediency, they were harvested in July at the age of 11½ months. Provisional selections only were made from this trial, and final selections will depend on the combined results of the plant and ratoon crops, together with their reactions in the different disease-resistance trials.

VARIETAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

I.41 30.4	J.39 30.3	P.O.J.2878 36.4	J.37 26.9	L.118 26.6
J.37 29.2	P.O.J.2878 35.9	J.39 34.9	L.118 28.0	I.41 27.9
L.118 32.2	I.41 33.6	J.37 35.1	P.O.J.2878 40.4	J.39 31.0
J.39 29.5	J.37 30.0	L.118 30.2	I.41 34.5	P.O.J.2878 36.4
P.O.J.2878 39.4	L.118 31.6	I.41 31.7	J.39 31.6	J.37 35.4

Block.—A2.
Harvested.—Early September.
Age of Crop.—Twelve and a-half months.
Experimental Plan.—5 x 5 Latin square.
Plots.—0.05 acre.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Tons.	Tons.	Per cent.
I.41	34.2	14.0	31.6	14.1
L.118	37.3	13.8	29.7	14.4
J.37	37.7	11.4	31.3	11.7
J.39	41.0	13.5	31.5	14.3
P.O.J.2878 ..	41.2	14.0	37.7	14.4

DISCUSSION.

According to our usual practice whenever possible, trash was conserved in every second interspace after taking off the plant crop, whilst the alternate interspace was ratooned, and fertilizer (Sugar Bureau No. 1 ratooning mixture) was applied at the rate of 3 cwt. per acre. This was later followed by a top dressing of sulphate of ammonia at the rate of 240 lb. per acre. The standard P.O.J.2878 ratooned strongest, and maintained a noticeable lead throughout the growing period. Growth was slow at the outset, but all varieties made a big improvement following the autumn rains. P.O.J.2878, which appears to be well suited to the poorer forest soils on which this trial was established, outyielded the other varieties, and J.39, which showed promise here, reacted unfavourably in some areas to gumming disease, hence no selections were made from the Bureau seedlings in this trial.

OBSERVATIONAL VARIETAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

K.1 22.9	K.2 19.6	Korpi 15.1	K.6 27.1	K.55 23.0
Korpi 19.4	K.24 30.7	K.90 22.0	K.26 31.6	Korpi 24.4
K.15 31.5	K.56 7.8	Korpi 16.0	K.53 28.0	K.16 28.9
	K.9 22.3	K.19 25.6	Korpi 20.7	K.74 21.3
				K.94 25.3

Block.—A1.
Harvested.—September, 1942.
Age of Crop.—13 months.
Plots.—0.048 acre.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
K.1	Tons. 37.0	Per cent. 16.0	Tons. 22.9	Per cent. 15.7
K.2	29.4	13.4	19.6	14.2
K.6	34.2	10.0	27.1	11.3
K.9	35.4	14.1	22.8	16.1
K.15	37.5	11.9	31.5	13.8
K.16	39.7	13.7	28.9	13.9
K.19	28.7	16.1	25.6	16.8
K.24	34.8	13.3	30.7	15.1
K.26	39.2	12.5	31.6	14.2
K.55	32.0	16.9	23.0	18.5
K.56	30.1	14.8	7.8	16.5
K.58	38.5	12.4	28.0	16.3
K.74	31.2	12.9	21.3	15.2
K.90	29.8	15.5	22.0	15.1
K.94	26.6	12.3	25.3	13.6
Korpi average of 5 plots	29.8	16.5	19.1	17.8

DISCUSSION.

About one month after harvesting the plant crop in August, 1941, the trash was rolled into alternate interspaces, and the bare interspaces ratooned. The block then received a fertilizer application of Sugar Bureau No. 1 ratooning mixture at the rate of 3 cwt. per acre, which was followed later by a top-dressing of sulphate of ammonia at the rate of 240 lb. per acre. The varieties made little growth during the spring and summer months, but later made a rapid response to the autumn rains, and they had finally made appreciable growth by the time they were harvested in September, 1942. After eliminations had been made on account of unfavourable reactions in the different disease-resistance trials, the remaining varieties did not show outstanding merit, and apart from K.58, which had been selected in the previous year, no additional selections were made from this trial.

NEW VARIETIES.

The following new varieties were received from quarantine:—Vesta, Akbar, China, R.P.8, Toledo, C.P.38-773, C.P.38-782, C.P.38-907, C.P.39-339, and Q.P.39-424. The latter five canes contain a large proportion of the wild Turkestan strain of *S. spontaneum*, reputed to be resistant to frost.

In addition, Q.28, Q.42, C.S.R.1, and the six Hawaiian canes, 28-4291, 31-2484, 31-2806, 32-1063, 32-3575 and 32-8560, were received from the Palmerston nursery. All these varieties are growing well, and the more promising will be further propagated.

Of those varieties received previously, Trojan appears to possess considerable merit for certain lands in the northern areas, and stocks of this variety are being built up as rapidly as possible.

GERMINATION EXPERIMENT.

An experiment involving the overnight soaking of setts in water treated with various fungicides was set out during the most unfavourable germinating period of last winter, and the site of the trial was land that was fairly stiff and cold. The variety used was Korpi, which is a very indifferent striker under adverse conditions, and the object thus was to submit the treatments to the worst possible conditions for germination. Setts treated with the proprietary fungicide "Agrosan" not only gave a significantly higher percentage of germination, but in addition the strike was quicker, more regular, and the plants more advanced. This confirmed a previous experiment in which both "Ceresan" and "Agrosan" gave a uniformly high control of sett-invading fungi and appeared to stimulate development of the young plants. These preliminary experiments should provide the basis for post-war trials on a larger scale, for no doubt much effort is lost annually when bad strikes are experienced, and if these could, in a large measure, be forestalled at a small cost and outlay of labour to the grower, it would be a sound form of insurance when planting has, of necessity, to be carried out during risky periods.

LEGUMES.

Four varieties of cowpeas, Nos. 1566, 1573, 1579 and 1582, which were despatched from Head Office, were planted out in November in randomised trials with Poona pea as the standard. Soon after these varieties had germinated and become established they encountered the hot muggy thunderstorm weather that continued right throughout December, and wilt, which first affected a few plants, later invaded the whole planting. So heavy was the infection even on the well-drained red soils that whole plotlets of some varieties were wiped out and the variety 1582 alone resisted the disease.

In addition to possessing this desirable factor for wilt resistance it is also a vigorous grower, possesses a broad foliage, covers well, and does not seed until about March; hence it has a long growing period, and on that account shows considerable promise for these areas. The problem of providing a suitable legume for some of the stiff wet soils has long been a pressing one, and it is hoped that this legume will fulfil in part some of the exacting requirements of these lands. Seed of this variety was saved with the object of building up stocks for further plantings.

VEGETABLE PRODUCTION.

As indicated previously an effort was made last year to assist in supplementing the local food supply by devoting all available acreage to vegetable production. English and sweet potatoes as well as pumpkins were chosen as being most likely to yield worthwhile results under cane-growing conditions.

Varieties of English potatoes differed appreciably in their yields, but the heaviest yields came from the Tasmanian Brownells on the clayey soils. The yield of the variety Bismarck was comparable, but wilt caused premature death in a fairly large percentage of plants on the wetter soils. Carman was somewhat disappointing in view of the good reputation this variety enjoyed, and yields were inferior to the other varieties on both the friable and clayey soils. In all, the total yield from the English potato crop amounted to 5 tons 17 cwt.

Sweet potatoes were planted both during the winter and summer periods, and the latter produced by far the heavier crop. The winter crop encountered somewhat dry conditions after planting, and the yield was little more than 3½ tons per acre, whilst the summer crop produced in the vicinity of 10 tons per acre. Approximately 12 tons were forwarded to the Committee of Direction of Fruit Marketing under contract to the Army.

It is not recommended that cane-growers should plant to sweet potatoes any of their land ordinarily used for cane cultivation, as small tubers and pieces of vine later shoot and cause considerable trouble long after the sweet potato crop has been harvested, but where the land can be set aside permanently for vegetable production, or where it can later be used as a paddock for stock, it could be readily planted to this crop. Sweet potatoes not only require little attention, but they provide a valuable insurance against shortages in the supply of the usually preferred English potato. Several good named varieties are being maintained on this Experiment Station, and limited supplies will be available to growers who wish to build up stocks for their future plantings.

Apart from a small amount of readily controlled damage by the pumpkin beetle when the plants were young, the pumpkin crop made good growth, and over seven tons were harvested. This crop fits in well with most cane-growing programmes, and when once established requires a minimum of attention, and, moreover, harvesting of the crop can be made fairly elastic to suit the more pressing demands of cane cultivation, &c. More pumpkins might reasonably be grown by sugar-growers, and Army contracts should be allotted on a more rational basis by showing some preference to cane-growers in the eastern coastal towns, as this would involve a minimum of haulage to the centres of consumption and would help to relieve the strain on railway transport.

LABORATORY WORK.

The following is a summary of the analyses carried out during the year:—

Canes (maturity tests)	30
Canes (station samples other than maturity tests) ..	193
Canes (farm trials)	69
Canes (growers' samples)	11
Soil (lime tests)	12
Total	315

Crop Summary.

Cane sent to mill	Tons. 520.9
Cane used for plants and samples	7.6
Total	528.5
Total area harvested	17.8 acres
Tons per acre harvested	29.6 tons
Class of Cane—	Per Cent.
Plant cane	59.1
Ratoon cane	40.9

CENTRAL SUGAR EXPERIMENT STATION, MACKAY.

Mr. D. L. MCBRYDE, Chemist in Charge.

METEOROLOGICAL AND CROP GROWTH REPORTS.

Weather conditions during the period July-October, 1942, were ideal for the production of a heavy crop this year. Each month yielded above the usual amount of rain, and despite the fact that only 211 points of rain were registered in November, the crops were in a very promising state at the end of the year. December rainfall was excessive, 1,506 points being recorded as against the normal of 710. Falling at this time of the year, when the crops were young, the wet weather was instrumental in preventing almost all cultivation work, thus allowing the grass and weed growth to gain an early start. Further wet periods in January and February caused serious water-logging of the soils in the latter month, thus reducing considerably the earlier optimistic estimates of crop yields. The following tables furnish weather data of this period:—

ANNUAL RAINFALL SINCE 1920 AT SUGAR EXPERIMENT STATION, MACKAY.

Year.	Rainfall in Inches.	Year.	Rainfall in Inches.
1920	57.27	1933	71.94
1921	95.89	1934	37.57
1922	34.47	1935	45.15
1923	25.23	1936	97.37
1924	53.37	1937	56.60
1925	54.80	1938	52.18
1926	34.60	1939	56.14
1927	83.87	1940	84.97
1928	72.28	1941	71.38
1929	64.03	1942	77.92
1930	55.81	1943 (6 months)	49.21
1931	30.01	Average 23 years	59.23
1932	48.48		

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST JULY, 1942, TO 30TH JUNE, 1943.

Month.	Rainfall. (Inches.)	Wet Days.	Average Rainfall.	Shade Temperatures.					
				Maximum.			Minimum.		
				High.	Low.	Mean.	High.	Low.	Mean.
1942.									
July	2.49	10	1.38	82.0	67.5	74.0	68.0	37.5	54.9
August .. .	1.71	7	1.06	86.0	66.5	78.3	63.0	46.5	54.8
September ..	1.74	12	1.63	87.5	74.5	80.0	70.0	48.0	58.1
October .. .	3.81	14	1.64	89.0	78.5	83.8	71.0	49.5	60.1
November .. .	2.11	9	3.21	95.0	81.0	87.2	71.5	57.5	64.3
December .. .	15.06	27	7.10	93.5	74.0	84.1	74.5	62.5	69.9
1943.									
January .. .	15.90	14	13.98	93.0	81.0	86.1	74.0	65.0	69.5
February .. .	20.41	23	12.02	92.5	80.5	81.6	77.5	67.5	69.6
March .. .	1.08	12	10.41	89.0	83.5	85.6	74.0	60.5	66.1
April .. .	7.31	17	5.64	94.0	78.0	84.6	74.5	58.0	65.5
May .. .	1.82	16	3.23	83.5	73.5	77.5	69.5	44.0	57.0
June .. .	2.79	13	2.62	79.5	63.5	72.7	64.0	35.0	50.7
Totals .. .	76.23	174	63.92	..	..	..	..	..	..

The following varietal and fertilizer trials were harvested during the period:—

VARIETAL TRIAL (Plant Crop).

PLAN AND YIELDS.

G.22	Q.20	Q.28	Q.813	Q.25
20.4	14.4	27.4	17.1	23.6
Q.813	Q.25	G.22	Q.20	Q.28
13.6	20.0	21.9	17.3	24.6
Q.20	Q.28	Q.813	Q.25	G.22
17.5	25.8	15.6	22.5	22.1
Q.25	G.22	Q.20	Q.28	Q.813
24.9	25.2	15.4	22.5	14.0
Q.28	Q.813	Q.25	G.22	Q.20
29.4	11.5	21.1	25.0	18.6

Block.—B.2.

Harvested.—September, 1942.

Age of Crop.—12½ months.

Plan.—5 x 5 Latin square.

Plots.—0.0625 acre.

SUMMARY OF YIELDS.

Variety.	Cane per Acre.		C.C.S. in Cane.
	Tons.	Per Cent.	
G.22	22.9	13.0	
Q.20	16.6	16.6	
Q.25	22.4	14.1	
Q.28	25.9	15.5	
Q.813	14.3	17.2	

DISCUSSION.

Because of the dry state of the soil, it was necessary to give this field a light watering in October. A fairly good germination resulted, and canes grew well until the end of the year, when a slight check was caused by dry conditions. As soon as the wet season commenced, the canes made good headway, and were still making growth when harvested, all except Q.813 being still immature.

VARIETAL TRIAL (First Ratoon Crop).

PLAN AND YIELDS.

H.45	G.48	H.43	Q.813	H.63
35.0	16.5	31.0	13.5	26.3
H.63	H.43	Q.813	H.45	G.48
35.0	31.5	22.5	36.0	23.5
Q.813	H.45	H.63	G.48	H.43
15.8	28.8	29.5	22.8	29.0
G.48	H.63	H.45	H.43	Q.813
22.8	27.0	35.3	31.8	18.0
H.43	Q.813	G.48	H.63	H.45
28.0	17.8	28.5	27.3	27.3

Block.—A.5.

Harvested.—August-September, 1942.

Age of Crop.—11 months.

Plan.—5 x 5 Latin square.

Plots.—0.0625 acre.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.	Tons.	Per cent.
G. 48	12.2	15.3	22.8	14.2
H.43	22.4	14.0	30.3	13.6
H.45	21.9	15.3	32.6	14.8
H.63	21.4	14.5	29.0	15.4
Q.813	18.6	14.6	17.9	16.3

DISCUSSION.

The canes made good growth and stooling, but were checked by waterlogging in February. Well spaced rains thereafter and a mild winter kept the canes, except Q.813, growing throughout, and all were harvested in a very immature condition.

YIELD OBSERVATIONAL TRIAL (Plant Crop).
PLAN AND YIELDS.

A.103 20.0	A.130 25.5	A.147 22.5	A.178 18.0
Atlas 21.0	Q.813 19.5	A.101 21.5	Q.813 17.5
A.124 22.8	A.150 14.5	A.192 23.3	A.123 14.5
A.155 22.0	A.100 17.3	A.187 20.0	A.146 20.8
Q.29 19.3	Q.813 16.8	A.143 16.8	Q.813 16.3

Block.—B.2.
Harvested.—September, 1942.
Age of Crop.—13 months.
Plan.—Single plot.
Plots.—0.05 acre.

SUMMARY OF YIELDS.

Variety.				Cane per Acre.	C.C.S. in Cane.
				Tons.	Per Cent.
A.100	..	..	..	17.8	..
A.101	..	..	..	21.5	..
A.103	..	..	..	20.0	14.0
A.123	..	..	..	14.5	..
A.124	..	..	..	22.8	..
A.130	..	..	..	25.5	14.1
A.143	..	..	..	16.8	..
A.146	..	..	..	20.8	..
A.147	..	..	..	22.5	15.1
A.150	..	..	..	14.5	..
A.155	..	..	..	22.0	..
A.178	..	..	..	18.0	..
A.187	..	..	..	20.0	15.2
A.192	..	..	..	23.3	..
Atlas	..	..	..	21.0	..
Q.29	..	..	..	19.3	..
Q.813 (average of 4 plots)	..	..	..	17.5	16.7

DISCUSSION.

Germinations were rather poor and irregular in this trial, due largely to the fact that plants were drawn from cane which had been partially frosted. Owing to the dry conditions it was necessary to give the block a light watering in October. Thereafter canes made good headway until the end of the year, when a slight check due to dry weather was received. As soon as the wet weather set in, shortly afterwards, all varieties made rapid growth and, with the exception of Q.813, were immature when harvested.

YIELD OBSERVATIONAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

I.22 17.0	I.25 17.6	Q.813 11.6
Q.813 11.4	I.3 13.2	I.70 15.2
I.68 8.4	Q.25 20.8	I.20 14.4
I.21 16.2	I.12 13.0	Q.813 12.8
Q.813 8.4	I.51 18.3	I.26 28.4
I.62 15.8	I.15 25.6	I.31 15.4
I.53 11.2	Q.813 10.0	I.2 14.2

Block.—A.5.
Harvested.—September, 1942.
Age of Crop.—11 months.
Plan.—Single plot.
Plots.—0.05 acre.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		Ratoon Crop.	
	Cane per Acre.	C.C.S.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.	Tons.	Per cent.
I.2	15.5	15.7	14.2	..
I.3	9.3	16.9	13.2	..
I.12	8.3	16.0	13.0	..
I.15	14.0	15.1	25.6	15.3
I.20	15.0	15.5	14.4	14.5
I.21	12.5	15.5	16.2	..
I.22	16.8	15.0	17.0	13.5
I.25	10.8	16.7	17.6	..
I.26	21.5	15.8	28.4	14.5
I.31	19.5	15.0	15.4	..
I.51	13.5	14.0	18.8	..
I.53	11.3	14.8	11.2	..
I.62	13.5	15.0	15.8	..
I.68	9.8	11.1	8.4	..
I.70	8.5	14.4	15.2	..
Q.25 (average of 5 plots) ..	18.3	15.0	20.8	..
Q.813 (average of 5 plots) ..	14.3	15.2	10.9	15.5

DISCUSSION.

The canes made good growth and stooling, but were checked by water-logging in February. Well spaced rains thereafter and a mild winter kept the canes, except Q.813, growing throughout, and all were harvested in a very immature condition.

FERTILITY TRIAL (Second Ratoon Crop).
PLAN AND YIELDS.

1N 0P 1K 27.5	2N 0P 2K 27.5	0N 2P 1K 16.9
2N 2P 0K 26.05	0N 1P 2K 19.3	1N 1P 0K 25.2
1N 2P 2K 31.25	2N 1P 1K 23.15	0N 0P 0K 16.25
0N 0P 2K 17.5	1N 1P 2K 24.4	2N 0P 1K 28.5
2N 2P 2K 26.7	1N 0P 0K 24.2	0N 2P 0K 20.2
0N 1P 1K 15.4	1N 2P 1K 24.0	2N 1P 0K 22.9
2N 2P 1K 26.25	0N 1P 0K 14.6	0N 0P 1K 17.1
1N 0P 2K 24.6	1N 1P 1K 20.4	0N 2P 2K 21.0
2N 1P 2K 27.3	2N 0P 0K 22.9	1N 2P 0K 28.5

Block.—B.3.
Harvested.—September, 1942.
Age of Crop.—11 months.
Plan.—3 x 3 x 3 factorial.
Plots.—0.0695 acre.
Variety.—Q.28.

Fertilizer Treatments:

- 0N = No nitrogenous manure.
- 1N = 200 lb. ammonium sulphate per acre.
- 2N = 400 lb. ammonium sulphate per acre.
- 0P = No phosphatic manure.
- 1P = 200 lb. superphosphate per acre.
- 2P = 400 lb. superphosphate per acre.
- 0K = No potassic manure.
- 1K = 125 lb. muriate of potash per acre.
- 2K = 250 lb. muriate of potash per acre.

All P and K as well as all 1 and 2N plots received P and K and 1N treatments as topdressing after ratooning; 2N plots received a second application of 1N at later date.

SUMMARY OF YIELDS.

Treatments.	Plant Crop.		First Ratoons.		Second Ratoons.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Per Cent.
0N	30.2	15.4	22.2	16.1	17.6	12.9
1N	30.8	14.7	25.5	15.1	25.3	13.0
2N	31.7	16.0	26.5	14.9	26.3	12.6
0P	30.5	15.8	24.6	14.6	22.9	13.0
1P	31.0	15.1	23.9	15.3	22.0	14.6
2P	31.1	16.0	25.7	15.6	24.3	14.7
0K	30.9	15.6	25.3	15.6	22.1	13.7
1K	30.8	16.0	23.8	14.7	22.7	14.7
2K	30.9	15.2	25.2	15.3	24.45	13.7

DISCUSSION.

The ratoons came away well, but were checked by water-logging in February, and grew slowly for two months there- after. From then on until harvested the crop continued to make good growth and was harvested in an immature state.

As with the first ratoon crop, the application of sulphate of ammonia has again resulted in a substantial increase in crop yield, and superphosphate and potash have also shown small gains, indicating the need to include these substances in any fertilizer programme for this soil type.

ROTATIONAL EXPERIMENTAL BLOCK: DIVISION C.

Section C6.—A very poor plant crop of Comus was harvested from this block, yielding 19.7 tons per acre, with an average C.C.S. of 14.1. The stubble ratooned poorly, and the young shoots were eaten back by sheep during the first three weeks after harvesting, causing such an open stand that it was decided not to carry the crop through for harvesting as ratoons.

Three tons of plants were sold from the ratoons, the rest cut for horse feed, and the block then ploughed out. Poona pea was sown, and the crop ploughed under.

Section C7 was planted under Comus in September, and gave a fair germination. The crop was rather spoiled by wetness and our inability to work the soil after the commence- ment of the wet season. Cane has made good growth on the higher portions, but is poor next to the water furrows.

Sheep.—Owing to the infestation of sheep by the nodule worm becoming increasingly heavy each year, more especially in the lambs, and our inability to counteract the effects of the parasites by fortnightly drenching with bluestone and nicotine solution or with phenothiazine emulsion, it was decided to dispose of the flock, and all sheep were sold to a local butcher.

LABORATORY WORK.

The demand for tests of farmers' samples was very light again this year. Following are details of samples which were put through:—

Station samples	240
Farmers' samples	18
Farm trial samples	70
Total	328

Crop Summary.

Total cane harvested (including cane used for plants, samples, &c.)	440.55 tons
Total area harvested	20.0 acres
Tons cane per acre harvested	22.03 tons
Class of cane—	Per Cent.
Plant cane	76.0
Ratoon cane	24.0

SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG.

Mr. N. J. KING, Chemist in Charge.

METEOROLOGICAL AND NOTES ON CROP GROWTH.

July to December, 1942, the first half of the period under review, was mostly dry. Fortunately, reasonable July rains reduced the incidence of frost, but this was followed by a rainless August and a dry September, October, and November. Good December rains gave promise of an early wet season, when upwards of 8 inches fell on eleven wet days. The promise was not fulfilled, and a very dry January banished the hopes of good crops. February was exceptionally wet with 19 inches of rain, but from then until the end of June no beneficial falls were experienced. Altogether it was a disappointing and unusual wet season. Only one of the usual wet months gave any appreciable rainfall, and as 10 inches of this fell in one day much was wasted.

The 1942 crop was a small one in the Bundaberg area. Following a very dry spring in 1941—the six months rainfall was only 3.60 inches—crops were slow to respond to the wet season rains, and growth did not really begin until February, 1942. In consequence crops were light at harvest time, and were also low in sugar owing to the late growth. Fortunately, a fairly open winter was experienced, as frosts would have played havoc with the backward cane. In consequence of the small crops there was a fair acreage stood over to 1943. P.O.J.2878 again constituted the major proportion of the crop. P.O.J.213 was again reduced in acreage, while Q.25 is on the increase.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT SOUTHERN EXPERIMENT STATION, BUNDABERG, FROM 1ST JULY, 1942, TO 30TH JUNE, 1943.

Month.	Rainfall. (Inches.)	Wet Days.	Shade Temperatures.						Mean Diurnal Range.	Mean Tempera- ture, 8 a.m.	Mean Relative Humidity 8 a.m.
			Maximum.			Minimum.					
			High.	Low.	Mean.	High.	Low.	Mean.			
1942.											
July	2.20	2	78	59	69.5	66	37	50.3	19.2	58.4	94
August	0	0	81	71	75.8	59	38	48.7	27.1	59.4	94
September	1.42	6	82	67	79.9	69	40	56.6	23.3	66.2	84
October	0.98	2	86	74	79.6	73	43	59.0	20.6	68.7	75
November	2.26	4	93	79	87.7	74	58	67.4	20.3	77.6	73
December	7.73	11	89	73	84.9	74	59	69.1	15.3	76.6	86
1943.											
January	1.81	6	90	78	83.5	76	62	68.6	14.9	75.9	81
February	19.05	10	89	77	86.2	76	61	72.7	13.5	77.2	91
March	0.14	1	86	81	84.0	70	60	64.1	19.9	69.5	93
April	1.72	4	89	78	82.2	70	46	60.1	22.1	69.8	80
May	2.29	4	81	64	74.8	65	45	55.0	19.8	61.7	83
June	1.15	3	74	60	69.4	57	33	44.9	24.5	53.3	86

Note.—During daylight-saving period mean temperatures and humidity at 8 a.m. would be actually 7 a.m. standard time.

The following are the rainfall records taken at this station since the Experiment Station began operations in 1914. To conform with the year covered by the report, the rainfalls are given for the growing season beginning in July and ending in June:—

1914-1915	..	..	31-99	1929-1930	..	..	43-16
1915-1916	..	..	28-54	1930-1931	..	..	47-19
1916-1917	..	..	58-08	1931-1932	..	..	22-88
1917-1918	..	..	49-85	1932-1933	..	..	36-81
1918-1919	..	..	24-24	1933-1934	..	..	71-45
1919-1920	..	..	28-20	1934-1935	..	..	40-01
1920-1921	..	..	45-16	1935-1936	..	..	44-24
1921-1922	..	..	44-97	1936-1937	..	..	31-65
1922-1923	..	..	37-14	1937-1938	..	..	44-40
1923-1924	..	..	34-16	1938-1939	..	..	41-01
1924-1925	..	..	50-06	1939-1940	..	..	41-69
1925-1926	..	..	37-62	1940-1941	..	..	43-26
1926-1927	..	..	68-18	1941-1942	..	..	33-52
1927-1928	..	..	74-69	1942-1943	..	..	40-75
1928-1929	..	..	31-16				

WORK OF THE STATION.
VARIETAL TRIAL (Plant Crop).
PLAN AND YIELDS.

I.6	I.11	I.9	H.6	Co.290
26.5	25.2	29.2	31.1	24.0
I.9	Co.290	H.6	I.11	I.6
28.0	23.2	30.3	24.6	25.2
H.6	I.9	I.6	Co.290	I.11
28.6	27.8	27.0	23.6	24.3
I.11	I.6	Co.290	I.9	H.6
24.2	25.4	22.7	27.0	29.7
Co.290	H.6	I.11	I.6	I.9
21.8	28.2	24.0	26.3	27.3

Block.—A.2.
Harvested.—October, 1942.
Age of Crop.—Thirteen months.
Plan.—5 x 5 Latin square.
Rows per plot.—Eight.
Plot area.—0.0518 acre.
Fertilizer.—4 cwt. per acre Sugar Bureau No. 2 mixture was supplied to all plots.

SUMMARY OF YIELDS.						
Variety.					Cane per Acre.	C.C.S. in Cane.
					Tons.	Per Cent.
H.6	..	..	..	..	29-6	13-0
I.6	..	..	..	..	26-1	15-9
I.9	..	..	..	..	27-9	13-7
I.11	..	..	..	..	24-5	15-3
Co. 290	..	..	..	..	23-1	12-4

DISCUSSION.
Very dry conditions at planting time made irrigation for a strike imperative. A good strike was obtained. Plants were taken from the top two-thirds of the stalk only to eliminate the bad germinating bottom eyes. Growth was slow until the January rains, and was fair afterwards. The variety H.6 was in the lead from the start, but the sugar content may be too low; I.9 appears to be the best cane on this trial. The three I. seedlings in the trial are from the cross P.O.J.2725 x Co.290.

OBSERVATIONAL VARIETAL TRIAL (Standover Plant Crop).
PLAN AND YIELDS.

Co.290	P.O.J.2878	Q.42	I.65
17.7	28.4	45.5	37.4
Q.20	30 S.N.673 (Atlas)	P.O.J.2878	C.P.29/116
20.4	39.9	31.2	60.4
H.3	Q.25	I.17	P.O.J.2878
48.3	36.1	32.0	45.7
P.O.J.2878	I.10	I.21	I.4
39.5	40.8	51.8	45.5

Block.—A.3.
Harvested.—August, 1942.
Age of Crop.—Twenty-two months.
Plan.—Single plots.
Rows per Plot.—Eight.
Plot Area.—0.0785 acre.
The varieties were selected as being suitable types for standover purposes.

SUMMARY OF YIELDS.						
Variety.				Standover Plant.		
				Cane per Acre.	C.C.S. in Cane.	
				Tons.	Per Cent.	
H.3	..	..	..	48-3	12-3	
I.4	..	..	..	45-5	11-7	
I.10	..	..	..	40-8	12-2	
I.17	..	..	..	32-0	8-9	
I.21	..	..	..	51-8	12-6	
I.65	..	..	..	37-4	12-1	
Q.20	..	..	..	20-4	13-6*	
Q.25	..	..	..	36-1	12-2	
Q.42	..	..	..	45-5	13-8	
Co.290	..	..	..	17-7	10-3	
C.P.29/116	..	..	..	60-4	13-7	
30 S.N.673 (Atlas)	..	..	..	39-9	12-9	
P.O.J.2878 (4 plots)	..	..	..	36-2	13-0	

* Mixture of Q.20 and P.O.J.2878, vide Discussion.

DISCUSSION.
The crop made very slow headway during the first year. The severe drought in spring and summer of 1941 gave all varieties a severe test, and Co.290 practically died out. The initial strike of Q.20 was so bad that it was filled up with P.O.J.2878, and the yield of this plot is not indicative of Q.20. The second growth year was much better, and Q.42, CP.29-116, and Atlas made excellent growth.
Fertilizer used was 4 cwt. per acre of Sugar Bureau No. 2 placed in the drill at planting, and a top-dressing in January, 1941, of one and a-half bags of sulphate of ammonia per acre. The crop followed a ploughout of other cane with no legume fallow.

OBSERVATIONAL VARIETAL TRIAL (Plant Crop).
PLAN AND YIELDS.

A.11	A.31	A.24	A.45
26.8	28.2	25.6	24.5
Co.290	A.18	Co.290	A.36
21.4	25.3	20.8	17.7
A.16	32-8560	A.22	A.21
31.3	28.2	19.5	23.7
A.41	Co.290	A.43	A.27
14.6	25.8	24.7	14.1
A.26	A.13	A.14	Co.290
25.6	18.2	26.0	20.6

Block.—E.2.
Harvested.—August, 1942.
Age of Crop.—Twelve months.
Rows per Plot.—Eight.
Area of Plot.—0.048 acre.
Varieties selected from 40-stool plots of seedlings.

SUMMARY OF YIELDS.						
Variety.				Plant Crop.		
				Cane per Acre.	C.C.S. in Cane.	
				Tons.	Per Cent.	
A.11	..	..	..	26-8	10-7	
A.13	..	..	..	18-2	10-8	
A.14	..	..	..	26-0	11-5	
A.16	..	..	..	31-3	11-5	
A.18	..	..	..	25-3	9-0	
A.21	..	..	..	23-7	10-9	
A.26	..	..	..	25-6	9-7	
A.27	..	..	..	14-1	12-2	
A.31	..	..	..	28-2	12-3	
A.36	..	..	..	17-7	7-7	
A.41	..	..	..	14-6	10-3	
A.43	..	..	..	24-7	10-5	
32-8560	..	..	..	28-2	11-1	
Co.290 (4 plots)	..	..	..	22-2	10-3	

DISCUSSION.

Dry conditions prevailed at planting, and irrigation was applied to ensure germination. The Hawaiian variety 32-8560 was included owing to its resistance to downy mildew and its vigour. Fair growth took place after the late January rains in 1942, but all varieties were immature at harvest time and gave low sugar content. 32-8560 led during the early growth, but did not maintain the lead.

VARIETAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

P.O.J.2878	Co.290	Q.25
27.6	25.4	28.3
Q.25	P.O.J.2878	Co.290
27.7	26.3	23.2
Co.290	Q.25	P.O.J.2878
22.9	27.2	24.2
Q.25	P.O.J.2878	Co.290
24.8	22.7	20.2
P.O.J.2878	Co.290	Q.25
21.1	21.3	23.1
Co.290	Q.25	P.O.J.2878
20.5	22.0	21.5

Block.—B.3.
Harvested.—October, 1942.
Age of Crop.—Thirteen months.
Plan.—Duplicate 3 x 3 Latin square.
Rows per Plot.—Ten.
Plot Area.—0.0847 acre.
Fertilizer.—3 cwt. per acre Sugar Bureau No. 3 mixture, plus one and a-half bags per acre sulphate of ammonia.

SUMMARY OF YIELDS.

Variety.	Plant Cane.		First Ratoon Cane.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
Co.290	Tons. 28.5	Per cent. 14.6	Tons. 22.3	Per cent. 13.2
P.O.J.2878	33.9	14.0	23.9	13.8
Q.25	36.8	13.9	25.5	14.0

DISCUSSION.

Ratoons were slow coming away owing to the severe winter in 1941. Q.25 was slowest to grow in the early stages. No growth of consequence took place during the very dry spring and early summer, and because of this the cane did not benefit immediately from the late January rains. Once recovered the growth up to May was good.

OBSERVATIONAL VARIETAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

I.6	I.31	I.11	I.43
40.1	35.2	40.7	42.8
Co.290	I.46	Co.290	I.62
26.4	36.7	29.3	31.9
I.12	I.38	I.35	I.9
31.5	40.2	39.9	32.3
I.27	Co.290	I.15	Co. 290
28.4	26.2		25.8
I.25	I.64	I.49	I.41
20.6	32.7	29.3	26.4

Block.—D.1.
Harvested.—October-November, 1942.
Age of Crop.—Twelve months.
Plan.—Single plots.
Rows per Plot.—Eight.
Plot Area.—0.0347 acre.

Fertilizer.—3 cwt. per acre Sugar Bureau No. 2 mixture was applied uniformly, followed later by a top dressing of one and a-half bags of sulphate of ammonia.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
I.6	Tons. 49.0	Per Cent. 15.1	Tons. 40.1	Per Cent. 15.2
I.9	41.5	15.8	32.3	15.0
I.11	51.2	15.1	40.7	14.8
I.12	37.8	15.2	31.5	14.4
I.15	39.4	14.3	30.1	15.8
I.25	38.2	15.7	20.6	15.9
I.27	35.7	15.7	28.4	15.2
I.31	45.5	14.9	35.2	15.4
I.35	48.3	14.8	39.9	15.5
I.38	49.5	14.0	40.2	15.2
I.41	33.6	17.4	26.4	14.8
I.43	56.3	14.5	42.8	14.9
I.46	46.3	12.8	36.7	15.2
I.49	37.1	16.0	29.3	14.6
I.62	40.4	16.2	31.9	15.0
I.64	40.8	14.9	32.7	14.9
Co.290 (4 plots) ..	37.0	14.4	26.9	14.5

DISCUSSION.

This block has a severe moisture gradient, and cane at the top end is always better than elsewhere. Consequently varieties must be compared with the adjoining Co.290 plot. Here again growth after ratooning was slow until February, and all cane made was due to late growth. As the block was not harvested until late October the sugar content is quite good. Most of these varieties have succumbed to downy mildew or Fiji disease, but some have been planted in further trials.

VARIETAL TRIAL (First Ratoon Crop).
PLAN AND YIELDS.

G.34	H.16	G.16	G.10	Co.290
28.3	26.0	28.0	27.1	24.4
G.16	G.10	Co.290	H.16	G.34
27.4	26.3	25.1	25.2	27.2
Co.290	G.16	G.10	G.34	H.16
24.3	26.9	25.8	28.0	26.1
H.16	Co.290	G.34	G.16	G.10
26.8	23.2	26.5	27.3	26.1
G.10	G.34	H.16	Co.290	G.16
26.0	29.3	25.7	21.3	25.1

Block.—D.2.
Harvested.—October, 1942.
Age of Crop.—Twelve and a-half months.
Plan.—5 x 5 Latin square.
Rows per Plot.—Seven. Guard rows of P.O.J.234.
Plot Area.—0.0521 acre.

Fertilizer.—3 cwt. Sugar Bureau No. 2 mixture per acre at ratooning time, and one and a-half bags per acre sulphate of ammonia in December.

SUMMARY OF YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
G.10	Tons. 32.6	Per Cent. 16.0	Tons. 26.3	Per Cent. 15.2
G.16	35.0	15.8	26.9	15.3
G.34	34.6	16.5	27.9	15.4
H.16	31.3	15.9	26.0	14.8
Co.290 (5 plots) ..	32.8	14.5	23.7	13.9

DISCUSSION.

G.34, which performed best in the plant crop, made the best start in the ratoons. The ratoons came away well but in the drought made little headway. It was not until January that rain fell to promote vigorous growth. From then until May, 1942, the conditions were good. Sugar content was high in this trial owing to the late date of harvesting.

FACTORIAL FERTILITY TRIAL (Plant Crop).
PLAN AND YIELDS.

1N 1P 0K	2N 1P 1K	0N 2P 0K
16.4	23.7	22.4
2N 2P 2K	0N 0P 1K	1N 0P 2K
28.0	21.3	24.6
0N 1P 2K	1N 2P 1K	2N 0P 0K
22.4	20.5	23.3
2N 0P 1K	0N 1P 0K	1N 2P 2K
22.6	15.7	23.5
0N 0P 2K	1N 0P 0K	2N 2P 0K
20.4	15.5	17.2
1N 1P 1K	2N 1P 2K	0N 2P 1K
23.7	24.2	26.2
0N 1P 1K	1N 2P 0K	2N 2P 1K
24.4	23.3	27.6
2N 1P 0K	0N 0P 0K	1N 0P 1K
20.9	21.4	26.2
1N 1P 2K	2N 0P 2K	0N 2P 2K
29.0	26.7	25.8

Block.—B.1.
Crop.—Plant cane.
Harvested.—August, 1942.
Age of Crop.—Eighteen months.
Plan.—3 x 3 Factorial trial.
Rows per Plot.—12.
Plot Area.—0.067 acre.
Variety.—Q.25.
Fertilizer Treatments—

- 0N = No nitrogenous manure.
- 1N = 120 lb. ammonium sulphate per acre.
- 2N = 240 lb. ammonium sulphate per acre.
- 0P = No phosphatic manure.
- 1P = 400 lb. superphosphate per acre.
- 2P = 800 lb. superphosphate per acre.
- 0K = No potassic manure.
- 1K = 180 lb. muriate of potash per acre.
- 2K = 360 lb. muriate of potash per acre.

SUMMARY OF YIELDS.

Treatment.	Plant Crop.	
	Cane per Acre.	C.C.S. in Cane.
0N	Tons. 22.2	Per Cent. 13.4
1N	22.5	14.0
2N	23.8	13.2
0P	22.4	13.7
1P	22.3	13.5
2P	23.8	13.4
0K	19.6	13.3
1K	25.0	13.3
2K	24.0	13.9

DISCUSSION.

A good germination was obtained. During the winter of 1941 the crop was frosted badly and killed right back to ground level. It came away well but slowly owing to the severe winter. Growth was then very slow until February, 1942, when good conditions developed. This trial was planted in exactly the same plot positions as the previous factorial trial and with the same treatments. Only the variety was changed. A legume crop was grown during the fallow, so it was not expected that nitrogen would be a limiting factor until the ratoon crop. Actually, a slight response is shown for

the 2N application, but this is offset by the drop in C.C.S. Potash deficiency is again demonstrated for this block, the smaller application of 180 lb. of muriate of potash giving an increase of 5.4 tons of cane per acre. The results from the ratoons should record additional benefits from applications of this fertilizer.

MOLASSES v. FERTILIZER TRIAL (Second Ratoon Crop).
PLAN AND YIELDS.

B 22.0	A 17.6	C 28.3	D 31.2
C 28.1	D 28.3	A 22.3	B 24.2
D 29.1	C 28.7	B 21.6	A 18.0
A 23.9	B 22.7	D 33.2	C 33.0

Block.—E3b.
Harvested.—November, 1942.
Age of Crop.—12 months.
Plan.—4 x 4 Latin square.
Rows per Plot.—12.
Plot Area.—0.075 acre.
Fertilizer Treatments—
A. No fertilizer.
B. Molasses—8 tons per acre.
C. Molasses—4 tons per acre, plus fertilizer equivalent of 4 tons molasses.
D. Fertilizer equivalent to 8 tons per acre of molasses.

SUMMARY OF YIELDS.

Treatments.	First Ratoon Crop.		Second Ratoon Crop.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.
A	Tons. 23.0	Per Cent. 15.7	Tons. 20.5	Per Cent. 16.4
B	26.8	15.8	22.6	15.5
C	33.7	15.2	29.5	15.7
D	34.9	15.2	30.5	15.3

DISCUSSION.

Molasses was applied alongside the row immediately the previous crop was harvested. The P and K were applied on the respective plots at the same time. When the molasses was decomposed the block was ratooned with the grubber. The necessary sulphate of ammonia was applied to the C and D plots when the ratoons were well away. Growth was not good on the block owing to the drought, but the results have borne out to a certain extent those of the previous crop.

VEGETABLE PRODUCTION.

Owing to reduced labour on this Experiment Station it was decided during 1942 not to raise any new cane seedlings, and this allowed a certain amount of land to be devoted to other crops. As a result of the Commonwealth Government's appeal to grow more vegetables this small acreage was devoted to vegetable production. The block of land was suitably situated for irrigation, and many years of cane cultivation had made the land almost weed free. During the spring and summer of 1942 and the autumn of 1943 the following vegetables were produced under Army contract and sold to the Contracts Board:—

White turnips	3 tons.
Beetroot	4 tons.
Potatoes	3 tons 3 cwt.
Cucumbers	50 cases.
Marrows	4 cwt.
Carrots	2 tons 16 cwt.
Sweet potatoes	8 tons.
Pumpkins	1 ton.

LABORATORY WORK.

Cane Samples—	
Station	286
Farmers	93
Farmers' irrigation waters	29
Total	408

Crop Summary.

Cane sent to Mill	Tons. 420.3
Used for plants	3.0
Used for samples	4.0
Total	427.3
Acreage harvested	15.7
Tonnage per acre	27.2

REPORT OF THE COMMITTEE ON SEEDLING PROPAGATION.

By MR. C. G. HUGHES, Assistant Pathologist.

Although the staff available for cross pollination is still very much depleted a special effort enabled a somewhat limited number of crosses to be carried out at Meringa. The list was not as wide nor as comprehensive as was desired, and was largely confined to crosses whose performances at one or other of the stations had been promising enough to warrant further trial. Arrowing in general was good, and most desired crosses were made without very much trouble. We have observed in previous years a marked correlation between intensity and duration of the wet season and the amount of arrowing; this year it would appear at first sight (see Table I.) that an excellent arrowing season has occurred when the total rainfall and number of wet days in the January to April wet season has been below average. The explanation for this appears to lie in the fact that heavy and continuous rain in December saturated the soil, which then remained wet through the comparatively dry January until saturated again in February. This effect would be carried forward well into March and April, when there were light showers almost every second day.

TABLE I.
RELATION OF ARROWING AT MERINGA TO WET SEASON CONDITIONS.

Year.	Rainfall.	Jan.	Feb.	Mar.	Apr.	Totals.	Arrowing.
1937	Rain in inches ..	8.4	4.7	16.4	4.9	32.4	Poor
	Wet days ..	18	15	20	6	59	
1938	Rain in inches ..	18.8	18.9	2.7	0.5	40.9	Poor
	Wet days ..	14	18	9	6	47	
1939	Rain in inches ..	26.1	36.9	34.7	9.3	107.0	Excellent
	Wet days ..	19	14	19	22	74	
1940	Rain in inches ..	12.7	18.9	34.4	7.3	73.3	Excellent
	Wet days ..	14	21	25	17	77	
1941	Rain in inches ..	12.2	24.2	15.4	18.7	70.5	Excellent
	Wet days ..	25	19	23	26	93	
1942	Rain in inches ..	3.2	12.0	3.8	8.4	27.4	Mediocre
	Wet days ..	11	20	13	19	63	
1943	Rain in inches ..	5.8	26.6	8.9	1.6	37.4	Excellent
	Wet days ..	14	24	14	14	66	

Observations in the Mackay district of Central Queensland have also shown a correlation between wet season conditions and arrowing; in 1941, January to April inclusive, 56 inches of rain on eighty-five wet days were recorded, and the arrowing was excellent; in 1943, there were 45 inches on sixty-six wet days over the same period, and arrows were extremely scarce. A similar correlation between rainfall and arrowing has been reported from overseas.

Some eighty-one crosses were made during the 1943 season. All were carried out with both male and female arrows in dilute sulphurous acid solutions. Results were generally satisfactory, although some arrows died before the ripening of the seed; this usually occurs, particularly with P.O.J.2725, early in the crossing season, while Co.290 is also unsatisfactory in solution. Weather conditions during pollination were fairly satisfactory, and clouds of pollen were seen on most mornings. Many of the crosses were made in large voile-covered lanterns arranged in batteries of four or eight; the rest of the crosses were distributed through a paddock of light forest at intervals wide enough to preclude contamination.

The crosses obtained are detailed in Table II. It is interesting to note that further crosses of *S. robustum* canes were obtained. Some second nobilisations of this species were also made.

TABLE II.
CROSSES EFFECTED DURING 1943 CROSS-POLLINATION SEASON.

Female Parent.	Male Parent.
Akbar	S.W.499
Atlas	Q.33, Q.36
Badila	C.278, Q.28, Q.41
C.P.29-116	P.O.J.2940
Cato	C.278, Co.290
Co.281	Q.36
Co.419	P.O.J.2940
I.140	Q.33
J.B.4	E.K.28
J.B.9	Q.31
K.39	K.5
Korpi	C.279, Co.290, H.Q.409, J.B.3, 28N.G.218, 28N.G.253, Q.39
N.G.16	Co.290, J.B.1, J.B.11, K.5, Q.36
Orambo	J.B.11, Q.39
P.O.J.2364	E.K.28, M.1900S., Pompey, Q.38, S.W.499
P.O.J.2725	Co.290, Q.33, Q.38, S.W.499
P.O.J.2875	H.Q.409
P.O.J.2878	Co.290, E.K.28, Q.33, Q.39, S.W.499
Q.19	C.278, Hind's Special, Uba Marot
Q.20	Badila, C.278, Co.290, K.5, 28N.G.218, 28N.G.253
Q.25	C.278, Co.290, J.B.11
Q.27	Uba Marot
Q.28	Badila, B.208, E.K.28, Q.31, Q.34, Q.39
Q.37	Badila
Q.42	Badila, Co.290, E.K.28, Q.34, Q.1098
Q.44	Uba Marot
S.J.4	E.K.28
	B.317, C.279, Co.290, H.Q.409, J.B.11, K.5, 28N.G.218, 28N.G.253, Q.39, Q.41

(Note.—The varieties designated "B," "C," "J.B." and "K" are Queensland raised seedlings which have been tentatively selected for breeding purposes; the behaviour of their progenies will determine advancement to "Q" status.)

Except for a few crosses germinated at Meringa all fuzz went into cold store for use next year.

Owing to shortage of labour there will be no original seedlings raised at Bundaberg this year (winter 1943), but Meringa and Mackay are germinating fuzz as usual. The seed being sown this year was obtained in 1941, and so has been in cold store for nearly two years. Germinations to hand already are satisfactory, but in a number of families the seedlings have died out within a few days or else remained runts. This has been observed in seedlings from stored fuzz before, but it has never caused the loss of any family; the longer period of storage would be expected to show an accentuation of the trouble. Sufficient seedlings will be available at Mackay and almost sufficient at Meringa from this long-stored fuzz.

No fuzz was germinated at Meringa or Bundaberg in 1942, and selections at these stations will be made on the ratoons of original seedlings planted in 1941. The ratoons have grown well at both centres, and the innovation of selection from ratoons will be watched with interest. Mackay station sowed in the ordinary way, but owing to violent fluctuations in temperature in the commercial storage rooms used germinations were not at all satisfactory. Eventually 4,020 seedlings were planted in the field. These suffered from excessive wet, and consequent poor cultivation, and have grown poorly.

At Meringa (except for three selections of *S. robustum* blood) and at Bundaberg tentative selections only were made in 1942 in the original seedlings. The 3,360 early-planted seedlings at Meringa gave some twenty-seven provisional selections, while the 8,720 in the batch planted later yielded forty-nine. At Bundaberg sixty-two seedlings were provisionally selected. Crops at both stations have been ratooned, and final selections are now being made. At Mackay the original seedlings were not ratooned, and final selections were made in the normal way. The crop had suffered from excessive wet and from light grub damage, but some seventy-seven seedlings were selected and, together with some recent introductions, were planted in the usual forty-sett plots.

Selections from the forty-sett plots of the "B" series were as follows:—Meringa, sixteen seedlings from fourteen families, as well as seven seedlings which gave insufficient sets for a yield-observation trial, but were propagated for further trial; Mackay, sixteen seedlings from eleven families; at Bundaberg no selections were made as the forty-sett plots were backward and were being carried to ratoons. Selections were planted in the usual yield-observation trials with Q.13 as standard at Meringa and Q.813 at Mackay.

The plant yield-observation trials of "A" seedlings at the three stations were cut and ratooned; final selection will be delayed until both plant and ratoon results are available.

Ratoon yield-observation trials were selected with the following results:—Meringa, K.58 had been advanced to a Latin square trial last year, and no other "K" variety was worthy of selection; Mackay I.15, I.21, I.26 were selected, and with H.45 and Q.813 went into the Latin square trial; Bundaberg, I.6, I.11, I.12, and I.15 were planted in a Latin square trial, although two of them (I.6 and I.11) had also been planted out the previous year.

The plant "check up" Latin square trials were harvested during the year. At Meringa, K.58 gave the lowest C.C.S. and tonnage, Q.44, Cato, and Comus were about equal in tonnage and sugar and better than the standard Q.10; it is not considered that K.58 is worthy of further trial. At Mackay, G.22 gave a poor performance and will be discarded, Q.20 gave a low tonnage, Q.25 was satisfactory in tonnage but rather low in sugar, and Q.28 yielded well with a reasonably good C.C.S. At Bundaberg all seedlings gave more sugar per acre than the standard Co.290, with I.6 and I.11 only slightly heavier in tonnage of cane but three units better in C.C.S.

The ratoon Latin square trial at Meringa showed the standard P.O.J.2878 much better than the seedlings, and none were propagated further. H.45 at Mackay was considered to be worth another trial, and has been planted again on the station. G.34 was the most impressive cane at Bundaberg, and has been planted in a farm propagation plot.

Following are some notes on varieties which have gone to farm trials or been placed on approved lists during recent years:—

Northern Districts.

Q.13—Appears to have withstood grub attack better than many standard canes, and its high quality is a big factor in its favour. Following excellent performances in both plant and ratoon crops on Meringa Experiment Station, it is being propagated further in the Mulgrave area.

Q.44—Requires rather good conditions for germination, but otherwise it has performed very well. It gives a good yield, will ratoon at any time of the year, and appears to have some resistance to a moderate grub infestation. It is on the approved list for Hambledon, Mulgrave, and Babinda areas, and small plots at Innisfail have been quite impressive,

Cato and Comus—These two canes are enjoying considerable popularity, and where approved in the northern areas have been planted out to the full extent of the available plants. C.C.S. figures for Comus at Innisfail have been rather low.

Trojan—In small plots has been quite impressive and shows promise of becoming a commercial variety. When the soil is reasonably good it grows quite well, although at times the cover is only mediocre.

Central Districts.

Q.25—Has impressed in plant crops, but ratoons this year have been failures.

Q.28—Has increased in acreage in the Mackay district at a phenomenal rate, and individual farm plantings of 6 to 15 acres are fairly common. It is proving a very valuable addition to the approved variety list for second-class soils. Its popularity is due in no small measure to its excellent agricultural qualities, which make it virtually a "fool-proof" cane to grow.

Q.45—Usually strikes well and ratoons very strongly. The stalks tapered somewhat this year, with the result that estimates of tonnage were usually too high. The trash was generally closely attached.

Comus—Has to be handled carefully to obtain good ratoons, but plant crops on suitable land have been excellent. It is somewhat susceptible to mosaic, and will have to be watched carefully on that account. Side shooting occurred as early as May in trials where poor cultivation had caused checks in growth.

Southern Districts.

Atlas—A standover type which is now on the approved list for Moreton Mill area, where its reasonably good Fiji resistance is a valuable asset. It needs good conditions to make satisfactory growth. It is in propagation plots at Bundaberg.

C.P.29-116—Is being distributed to a number of growers in the Bundaberg and Moreton districts. It is a good striker and first-year grower; it is not as sensitive to poor conditions as Atlas, but C.C.S. figures early in the season are low; where it does not arrow too freely it forms a satisfactory standover crop.

Q.25—Is on the approved list for the Bundaberg district. It does well as a one-year cane, but is not suitable for standing over.

Q.42—Has impressed in farm trials with its good germination and yield and comparative early maturity. In addition, it appears to be more resistant to frost damage than the present commercial varieties. It is being propagated in all southern mill areas.

VARIETAL STATISTICS.

The varietal composition of the crop harvested during the 1942 season is set out in Table III., all varieties, of which more than 1,000 tons were crushed, being listed. The percentages and tonnages are given for all varieties in each of the four main districts, as well as for the State as a whole.

Due to its pre-eminence in the far north, Badila is still easily the most important variety in Queensland, and while its tonnage is virtually unchanged its percentage, at 37.2, is slightly higher than in previous years. The percentage of P.O.J.2878 continues to increase in the southern district, and its position as second variety in the State is well established. Co.290 shows a decrease for the second year in succession; it may be that this variety has passed its peak in the Bundaberg and south areas, being replaced in part by P.O.J.2878 and probably Q.25. M.1900Sdg. and H.Q.426 have maintained their percentages and are now ahead of Co.290. H.Q.409 is grown in large amounts only on the Herbert River, in North Queensland, and is still very popular in the two mill areas there. The spectacular increases in the last two years of some of the new varieties are worthy of note; Q.10, Cato, and Q.25 made their first appearance on the variety list in 1941, with under 13,000 tons all told for the two northern varieties and 10,000 tons for Q.25; in 1942 the figures for Cato had jumped to 38,000 tons and Q.10 to about the same, while Q.25 had more than doubled. In contrast, P.O.J.213 is losing rapidly in popularity, and the 114,000 tons forming 2.2 per cent. of the 1940 crop has dropped to 28,000 tons and .65 per cent. in 1942; P.O.J.234 in 1940 yielded over 17,000 tons, but this year just gets into the table with 1,052 tons. Newcomers to the list are Trojan, S.J.16, and Eros, but Mahona is no longer included.

The composition of the crop on the basis of country of origin of the varieties is set out in Table IV. Canes from New Guinea (with Badila comprising 97 per cent. of the total) maintain their place at the top of the list, but there is a change in the second position where locally produced varieties, with nearly 1,000,000 tons, have for the first time moved ahead of the Javan. The figures for the remaining four countries each represent a single variety.

TABLE III.
QUEENSLAND CANE VARIETY CENSUS—1942 CROP.

VARIETAL COMPOSITION OF THE 1942 CANE CROP IN THE FOUR MAIN DISTRICTS AND THE STATE AS A WHOLE. TONNAGES COMPUTED FROM MILL RETURNS TO NEAREST 100 TONS.

Variety.	North of Townsville.		Giru and Burdekin.		Proserpine and Mackay.		Bundaberg and South.		Whole State.	
	Tons.	Per Cent. Crop.	Tons.	Per Cent. Crop.	Tons.	Per Cent. Crop.	Tons.	Per Cent. Crop.	Tons.	Per Cent. Crop.
1. Badila	1,135,700	56.6	419,700	69.0	64,900	6.6	..	..	1,620,200	37.2
2. P.O.J.2878	94,000	4.7	..	..	43,900	4.5	470,900	62.3	608,700	14.0
3. M.1900 Sdg.	..	..	..	..	336,900	34.4	100	.05	337,000	7.75
4. H.Q.426	183,400	9.1	22,000	3.6	104,700	10.7	..	..	310,100	7.1
5. Co.290	..	..	..	..	96,500	9.8	195,000	25.8	291,400	6.7
6. E.K.28	..	..	82,600	13.6	190,700	19.5	..	..	273,300	6.3
7. H.Q.409	177,500	8.8	..	..	..	..	..	..	177,500	4.1
8. S.J.2	14,250	.7	62,400	10.3	76,700	7.8	..	..	153,400	3.5
9. Pompey	77,800	3.9	..	..	..	..	..	..	77,800	1.8
10. S.J.4	69,800	3.5	7,200	1.2	..	..	..	..	77,000	1.8
11. Q.813	16,600	.8	..	..	40,400	4.1	12,000	1.6	69,000	1.6
12. Juno	54,800	2.7	..	..	..	..	..	..	54,800	1.3
13. Cato	38,000	1.9	..	..	..	..	..	..	38,000	.9
14. Q.10	37,400	1.9	..	..	..	..	..	..	37,400	.9
15. P.O.J.213	..	..	..	..	..	..	28,200	3.7	28,200	.65
16. D.1135	24,700	1.2	..	..	400	.05	1,000	.1	26,100	.6
17. Oramboo	11,500	.6	..	..	4,200	.4	9,300	1.2	25,000	.6
18. Korpi	13,600	.7	4,300	.7	700	.1	5,100	.7	23,700	.5
19. Q.25	..	..	..	..	..	..	23,100	3.1	23,100	.5
20. Q.2	20,900	1.0	..	..	..	..	..	..	20,900	.5
21. P.O.J.2725	1,450	.1	1,450	.2	7,600	.8	5,400	.7	15,900	.4
22. B.147	14,500	.7	..	..	..	..	..	..	14,500	.3
23. Q.20	..	..	2,700	.45	7,600	.8	..	..	10,300	.2
24. Brutus	10,200	.5	..	..	..	..	..	..	10,200	.2
25. P.O.J.2714	..	..	1,400	.2	2,600	.3	..	..	4,000	.1
26. Saturn	3,500	.2	..	..	..	..	..	..	3,500	.1
27. B.208	..	..	2,700	.45	..	..	..	..	2,700	.05
28. H.Q.285	..	..	..	..	400	.05	1,900	.3	2,300	.05
29. Vulcan	2,200	.1	..	..	..	..	..	..	2,200	.05
30. Eros	1,200	.1	..	..	..	..	..	..	1,200	.03
31. Nanemo	1,200	.1	..	..	..	..	..	..	1,200	.03
32. Trojan	1,200	.1	..	..	..	..	..	..	1,200	.03
33. S.J.16	..	..	1,100	.2	..	..	..	..	1,100	.02
34. P.O.J.234	..	..	..	..	..	..	1,100	.1	1,100	.02
Others	1,900	.1	500	.1	1,900	.2	2,400	.3	6,700	.15
Actual Tons Harvested ..	2,007,282	..	607,915	..	979,953	..	755,337	..	4,350,487	..

TABLE IV.
COMPOSITION OF 1942 CROP ON THE BASIS OF COUNTRY OF ORIGIN OF VARIETIES.

Country of Origin.	Tonnage Harvested.	Per Cent. of Crop.
New Guinea	1,670,100	38.4
Queensland	993,300	22.8
Java	948,400	21.8
Mauritius	337,000	7.75
India	291,400	6.7
Fiji	77,800	1.8
British West Indies	26,100	0.6
Unclassified	6,700	0.15

REPORT OF THE DIVISION OF ENTOMOLOGY AND PATHOLOGY.

By MR. R. W. MUNGOMERY, Entomologist.

The requirements of the war effort precluded any attempt to enlarge the activities of this Division, which in the previous year had been reduced to a mere skeleton organisation following the intensified national effort engendered by Japan's threat to our near North. Accordingly, the year's operations proceeded along the same reduced lines.

Owing to the difficulties experienced in obtaining necessary materials, staff shortages, and the activities of the remaining officers being fully absorbed in maintaining the Bureau's essential functions, it was virtually impossible to carry out further experimental work on cane pests during the year under review, and duties were confined mainly to advisory work in connection with pests, the establishment and conduct of disease resistance trials, and farm inspections undertaken to ensure that the disease situation should remain under control.

The conference of Cane Pests Boards, which in the pre-war period had been held annually, was again abandoned owing partly to the difficulties of travelling and accommodation, but chiefly on account of the fact that all available personnel of the various Boards were fully occupied. No good purpose would appear to have been served by discussing scarcities of materials, labour, &c., which the various sugar organisations were doing their utmost to overcome; and, as before indicated, it would have been impossible for the Bureau to undertake new experimental work even if discussions had established the desirability thereof.

The Cane Pest and Disease Control Boards continued to function efficiently, and due credit must be given to them and their supervisors for their sustained efforts in keeping the disease situation well in hand during a period when the position might easily have seriously deteriorated. In addition, they rendered valuable assistance in the setting out and harvesting of varietal trials, which in most cases were more or less intimately linked with disease control measures.

The difficulties connected with the transport of fumigant from the south, the depleted manpower situation, and the increased widespread infestation of greyback grubs (*Dermolepida albohirtum* Water.) in certain of the far northern areas, all combined to cause the worse grub damage on record within recent years. A further feature of this year's infestation was the heavy loss in tonnage per unit of grub infestation. In many instances an average of one or two grubs per stool caused appreciable loss in situations which in normal years would require three or more grubs per stool to make their presence apparent. It is believed that this high unit damage was bound up in some degree with the shortage of fertilizer, and in a greater degree with the exceptionally dry conditions which occurred after March, the under-nourished crops being rather more susceptible to grub damage, whilst the dry weather failed to keep the damaged cane from further deterioration. Not only was the loss of cane considerable, but the damage to stools also assumed serious proportions. This will have an adverse effect on ratooning, and in addition will necessitate an unusually heavy plough-out programme.

In the Mackay district, following early December rains and adverse autumn weather, grub damage this year, although sporadic, was the worst and most extensive since the 1937 and 1938 seasons, but the June rains helped to lessen their effects in all parts of the central district. In this area the collecting of beetles was reintroduced at the instigation of interested parties there, and approximately 13 tons of beetles were collected at a cost of £1,200, but, despite this, infestation was heavy. In the Burdekin district also a sum of approximately £2,000 was paid for collected beetles, and reports from this area also indicate appreciable damage, and much of the low-quality cane that was crushed at the commencement of the harvesting season was the direct result of grub attack.

In several of the areas liable to greyback grub infestation, particularly the far northern areas, grub damage appears to be on the increase, and unless conditions unfavourable for the survival of the beetle and/or its eggs prevail towards the end of the year the outlook for 1944 is not a particularly bright one.

Two factors kept the acreage of cane fumigated during the past season at a low level. Firstly, few, if any, of the Pests Boards received the total amount of fumigant they had ordered for the campaign, and it is thought that more consideration should be shown and greater effort made by those in authority to ensure the necessary fumigant going forward to the pest infested areas. After all, it is patently futile to urge growers to attempt to maintain their past production levels when they have not the means of combating pests, and they are thus forced to see their efforts come to nothing when grubs devastate their maturing crops. Secondly, the dearth of men suitable for operating the fumigant injectors further aggravated the position, and this matter is bound up with manpower releases. In many cases field workers were released only for harvesting operations, and greater knowledge by responsible authorities of the issues involved might induce them to effect releases for pest control work. In this instance again it should scarcely be necessary to draw attention to the inefficiency

involved in releasing men for harvesting badly grub-damaged cane when heavier crops of sound cane with a higher sugar content could be dealt with more expeditiously from the same acreage. Labour released for grub control work would be labour well utilised, as it would not only be the means of saving the existing crops but would save the ratoon crops as well, and render unnecessary the replanting of huge areas which must constitute an important drain on manpower. It is hoped that the newly-formed District War Agricultural Committees will be able to assist in having the necessary labour reserved and directed at the right time to those grub-infested cane lands that urgently need fumigating.

In addition to the acute labour deficiencies, growers had to face in some instances, the prospect of paying very high wages in order to secure satisfactory men for this fumigation work. This fact, coupled with an increased landed cost of carbon bisulphide, was reflected in a proportionately higher cost of fumigation. Nevertheless, in spite of these disabilities, the cost of fumigation was not excessive, due in the main to the almost exclusive use of the Blundell injector, and the total fumigation costs per acre compared favourably with those of 1939—i.e., before the advent of the Blundell injector.

The total acreage fumigated from Tully to Mossman during the past year amounted to 840 acres, which was slightly less than the previous year's acreage, and it is estimated that within these northern mill areas a further 8,300 acres were grub-infested, the estimated losses attributable to grub attack being in the vicinity of 67,000 tons. Fumigation in the Mackay district was conducted under difficult conditions, both as regards labour and weather, but approximately 130 acres were successfully treated, chiefly in the North Coast district.

Although areas of fairly intense infestations of French grubs (*Lepidiota Frenchi* Blk.) were noticed during the past year, damage was not so severe as in some previous seasons, and their harmful effects may have been considerably nullified by the good growing conditions that continued throughout the summer months—their period of development as third-stage grubs. However, the effects of recent greyback grub damage, necessitating the ploughing out and replanting of large areas, may have additional repercussions in respect of the French grub pest, involving the building up of heavy French grub populations. Consequently the possibility of increased damage by this pest in future years must not now be overlooked.

Spores of the bacterial diseases (*Bacillus popilliae* Dutky, and *Bacillus lentimorbus* Dutky) which cause milky disease and effect a considerable control of the Japanese beetle grubs (*Popillia japonica* Newm.) in certain parts of the United States of America, were the subject of experimentation during the year, and an attempt was made to inoculate greyback grubs with these organisms. Inoculations, however, proved unsuccessful, and further information relating to the inoculation technique is being sought from America.

The beetle borer pest (*Rhabdoenemis obscura* Bois.) assumed lesser proportions than in past years, and this may be partly attributed to the fact that crops were generally lighter, less lodged, and less succulent than in previous years, which is in direct consequence of reduced fertilizer applications brought about by wartime conditions. Top-rot incidence, which normally is an important factor contributing towards increased borer damage, was likewise less in evidence. Finally, reports coming to hand from the wetter areas indicate that the giant toad (*Bufo marinus* L.) is not without its effect in adding to the control of this pest.

Further improvement in borer control is likely to result from the higher proportion of cane that is to be burnt during the present harvesting season, for undoubtedly if pre-harvest burning of cane crops is judged solely on its effect on borer populations, it is one of the most effective methods of keeping the pest adequately controlled.

As anticipated in last year's report, there were few serious wireworm (*Laeon variabilis* Cand.) infestations during the spring of 1942. Owing to the limitations of manpower, a considerable amount of early planting was carried out in the Mackay district in 1943, and on account of the favourable weather some of these plantings extended well into May and June. The resulting strikes on the whole were good, and only a few minor wireworm attacks were noted. These pests, however, are expected to cause considerable trouble in the spring months should any of the typical low-lying wireworm lands be planted during that period.

Increased damage by rats was reported from various northern mill areas, whilst they also proved a nuisance on several farms in the central districts, but in no area did they assume plague proportions. The difficulties of keeping farm lands clean under the present wartime set-up has no doubt helped their inroads, and no immediate relief appears to be forthcoming from this undesirable state of affairs. The shortage in Australia of thallous sulphate is causing concern in those districts where this rodenticide has previously been used consistently and extensively.

Gumming disease was of little consequence during the past year. In the southern and central districts, where a few short years ago it seriously threatened the sugar industry, it is now unknown. In the north there was a substantial improvement in the situation, and following the elimination of fields of susceptible varieties in the Mulgrave area attention is now focussed upon the odd stools of these varieties still appearing as contaminants in other plantings; while the disease is difficult to find at present, there can be no thought of the re-introduction of susceptible commercial canes until it is absolutely certain that all these stools are eliminated. In the Hambledon area the odd stools are still a source of danger, while eight farms are still affected in that area, half of them being situated on the rich lands at Freshwater; care will have to be taken to ensure that the very popular variety, Badila, does not become infected over wide areas. At present estimated tonnage losses are small, and the area affected has shown a marked decrease in comparison with last year. This may be partly due to the weather, which has generally not been favourable for the spread of the disease, but the elimination of S.J.4 as old ratoons are ploughed out has had the greatest effect.

The usual gumming disease resistance trial was conducted in Brisbane, and gave the following results in the named varieties:—

Variety.	Dead Stalks.	Living Stalks Oozing Gum.
	Per Cent.	Per Cent.
Akbar	0	0
Atlas	0	0
China (Cow cane)	0	0
C.S.R.1 (Cow cane)	0	0
D.166/34	0	0
D.1135	0	4
E.G.1 (Cow cane)	0	0
H.Q.426	6	4
M.1900S	6	6
Q.30	0	0
Q.35	0	0
Q.41	0	0
Q.42	0	0
Q.46	10	7
Q.813	0	0
S.W.499	0	8
S.J.4	54	8

Weather conditions generally were unfavourable for a satisfactory trial, and damage in the standard varieties was less than the normal expectation. The current resistance trial containing mostly Bureau seedlings will be harvested shortly, and the results will be available for the selecting work on the stations.

Downy mildew disease in the Mossman, Hambledon, and Mulgrave areas appears to be well under control; at Mossman diseased fields were ploughed out after harvesting, and since then the disease has been located on only one farm; it has occurred on two adjoining farms in the Hambledon area, while at Mulgrave one field was found infected. In the Mackay district the new outbreaks reported last year appear to be under control, and there has been no further spread elsewhere; actually only eighty-seven diseased stools were found in the whole district, and the eleven farms which previously had the disease were all free at recent inspections. This state of affairs is especially pleasing in that conditions during the season just past were reasonably good for the spread of the disease. In the Bundaberg area, the southern limit of downy mildew, there was a further improvement; the 1347 diseased stools of cane found during the year ended 28th February, 1943, were just half the number of the previous year, averaging .055 stools per acre inspected compared with .074 in 1942. There was no downy mildew found in corn.

The downy mildew trial carried out near Cairns included chiefly Bureau seedlings, along with a few named varieties; of the latter Q.1098 and Neptune showed a much higher percentage of stick infection than the standard P.O.J.2878. At Bundaberg results were not conclusive, but there were indications that 32-3575 is fairly susceptible.

Fiji disease in the Bundaberg district showed an increase both in the total number of diseased stools and the number per acre inspected. The increase was due primarily to two factors—viz., the very mild winter in 1942 allowing a considerable carry-over of leaf hoppers and a rather intensive, though small and isolated, outbreak in the Fairymead area. However, the number of stools destroyed aggregated little more than the equivalent of one acre. Under these circumstances it is not considered that the increase gives any cause for alarm, and the Cane Pest and Disease Control Board is watching the situation carefully. In summarising the Fiji disease position in the district it is interesting to record that since systematic inspections have been carried out a total of 275 farms has been recorded as diseased; at present seventy-one of these are free from the disease, leaving 204 from which an average of twenty-eight stools per farm was rogued this season.

In the Maryborough area Fiji disease has shown a further decrease, only 390 stools being found in the 5,409 acres inspected. As a result of this satisfactory position it has been possible to establish plots of P.O.J.2878 and M.1900S, as a step in the re-introduction of these varieties. In the Isis area

there was an increase both in the number of farms diseased and the number of diseased stools found, but again there is no cause for alarm, and the Cane Pest and Disease Control Board has the situation well in hand. The increase can in large part be explained by the standing-over of diseased blocks, a regrettable practice, but sometimes unavoidable under present conditions. Fiji disease in the Moreton area has caused negligible losses, but its presence necessitates continuous inspections and vigorous control of planting material to keep it under control.

The Fiji resistance trial completed during the year showed a satisfactory amount of infection, and final results confirmed the interim observations published in the last report. Q.28, Katha, Saretha, *S. spontaneum* Tank, and *S. spontaneum* Burma must be regarded as highly resistant, while Co.364 showed only a small amount of infection; the Hawaiian canes, 28-4291, 31-2484, 31-2806, and 32-8560 were apparently highly susceptible; the standards, D.1135 and P.O.J.2878, showed 81 and 71 per cent. infection, respectively. The current trial has shown very little disease to date and is being ratooned again.

The usual small amount of leaf-scald disease was noticed in the far northern districts. In the Mulgrave area it was fairly prevalent in Orambo, particularly on low, wet lands, and from these foci of infection some spread had occurred to neighbouring fields of other varieties. Only odd stools occurred in other mill areas. The leaf-scald resistance trial on wet land was not satisfactory, and no conclusions could be drawn.

The position with regard to chlorotic streak is much the same as in previous years; a large scale attack on this insidious disease should be one of the first control projects undertaken after the war. This will probably include large-scale plant treatment, and will require the close co-operation of the mills.

Sclerotial leaf disease, usually of very minor importance, was reported to have caused some deaths in Badila and P.O.J.2878 in the Herbert River district. These followed the droughty periods in February and March, but later favourable weather conditions encouraged a general recovery in affected crops. The new variety Endor proved to be susceptible to this disease, and suffered rather badly.

The black discoloration of the sooty mould fungus was observed in some northern areas, and several farmers had to be reassured that the disfigurement was not seriously damaging their crops.

Mosaic disease received some publicity during the year owing to infections in some of the new varieties. It was observed in Q.25 and Q.28 and several of the standard canes in areas south of Townsville, being fairly widespread in the Mackay district. It is felt, however, that with the Cane Pest and Disease Control Boards functioning as they do, mosaic should never again become a major problem in this State.

The ubiquitous top rot was not common anywhere in Queensland, although red stripe was more prevalent than usual in the southern districts.

There are still some stools of non-approved varieties in the Cairns and Mackay districts, but despite the very much depleted field staff their numbers are being steadily reduced. In the Mackay district non-approved canes were found growing on 104 farms, but usually the roguing of a few stools per acre was sufficient to clean the fields concerned. However, there are still about fifteen small farms, mostly in rough country, with somewhat larger quantities of non-approved canes. The tonnage of cane involved is negligible, and the plantings will be eliminated in the near future.

Following suggestions that organic manures may have some influence on the bud growth of plants, over and above their fertilizer value, a trial was laid out on which one plot received 25 tons of farmyard manure per acre, another the equivalent in nitrogen, potassium, and phosphorus, and a third was kept as control. Two varieties, Q.44 and Korpi, were used, and the soil was comparatively new. Eight months after the application of the manures, and when the young plant cane had made good growth, setts were cut and planted out in three trials. There was no apparent effect from the organic manure treatment, but it remains to be seen whether there would have been some results on plants grown on an old, worn-out soil.

In September, 1942, owing to change in ownership of the farm, the varietal garden was transferred from Lawnton, some 16 miles north of Brisbane, to the new property of the Queensland Acclimatisation Society at Redland Bay. Some sixty varieties are propagated there, and all have made satisfactory growth.

There were no introductions from abroad during the year, and the quarantine house was mostly occupied with varieties being transferred across quarantine boundaries.

Bacterial cultures for the preplanting inoculation of green manure crops were again supplied by this Division, and farmers from all parts of the sugar belt took advantage of this service. In all, sufficient cultures to inoculate over 3,000 acres of legumes were distributed. Poona pea was sown to the greatest acreage with inoculated seed, but other cow peas, Gambia pea, and Mauritius bean were also well represented.

DIVISION OF MILL TECHNOLOGY.

Mr. E. R. BEHNE, Mill Technologist.

STAFF.

During the year ended 30th June, 1943, no staff changes have been made, so that the Technology staff engaged on sugar work consists of the Mill Technologist and the Laboratory Assistant, whose services are also available to the other Divisions of the Bureau.

MUTUAL CONTROL.

The fortnightly calculations of mill returns were not made for the 1942 season, as clerical staff was not available for the work. Returns covering the season's work of the mills were obtained and, based on these, the Eleventh Annual Synopsis of Mill Data for Mills in the Mutual Control has been prepared. This synopsis is at present in the hands of the printer; it covers the work of the same twenty-four mills as in previous years.

STANDARDISATION OF APPARATUS.

As in the previous year, only essential units of apparatus have been tested, and the following is a record of the pieces tested:—

Brix Spindles.—Two hundred and four spindles were tested, and three of these had errors outside the legal tolerance.

Polariscope Tubes—Thirteen tubes were tested; all were satisfactory.

PUBLICATIONS.

The only publication issued this year was News-Letter No. 10.

MILL RESEARCH PROGRAMME COMMITTEE.

No meeting of this committee has been held since 1941, as firstly, there has been no opportunity for convening such a meeting; secondly, the Technology staff is so reduced that no research would be conducted; whilst thirdly, the mills have been affected so adversely by present conditions that researches could not be accommodated.

WORK OF TECHNOLOGY DIVISION.

Egg Drying.

Although work was commenced on the building to house the egg-drying plant under the scheme described in last year's Annual Report the shortage of labour necessitated a cessation of the project, and to date no further work has been done.

Rubber Investigation.

Work by the Bureau in connection with the recovery of raw rubber from rubber-bearing plants in Queensland was interrupted by the 1942 crushing season. From the results obtained it would appear that wild *Cryptostegia* plants cannot be considered as an economic source of rubber. The work is to be continued a further stage, and the milling of *Hevea brasiliensis* is being investigated.

Other Work.

1. Through the Scientific Liaison Bureau the Bureau was requested to investigate a waste disposal problem at an abattoir adjacent to a large military camp. The locality was visited, and suitable means for abating the nuisance were suggested.

2. With the absence of the Director for the duration of the war, and the temporary absence of the Acting Director on other departmental duties, much of the directional work of the Bureau has fallen to the Mill Technologist.

MILL WORK, 1942 SEASON.

The 1942 crop was some 450,000 tons of cane less than that harvested in 1941, whilst the quantity of sugar produced (605,596 tons 94 n.t.) is the smallest output since 1932. The cane required to make 1 ton of 94 n.t. sugar was 7.18 tons, the second highest value in the past fourteen years. On only two occasions in this period has the value been greater than 7.0—in 1933 (7.21), and in 1942 (7.18). The lowest value recorded was 6.73 in 1937, whilst the average value for all seasons from 1929 to 1942 inclusive is 6.92.

The causes of the low tonnage and poor yield are several, but adverse weather during crushing, inadequate fertilization and cultivation, restricted planting, and prolonged crushing were the main contributing factors. In the Northern district a mild winter resulted in the cane continuing to grow during harvesting, and low C.C.S. values were obtained. Due to inadequate supplies of labour, particularly in the field, it was not possible to operate the factories at their usual capacities. Thus the crushing rate fell from 63.32 in 1941 to 55.93 in 1942, whilst the number of crop days increased from 4,034 to 4,432. Lost time, as would be expected, increased greatly under these conditions, 9.26 per cent. of the available time being the average value recorded. Most of this was due to cane supply—many mills closing down for days on end from this cause.

Milling efficiency improved considerably, the average value of 34.44 for the lost juice per cent. fibre being the lowest yet recorded. Doubtless the lower crushing rates and the higher dilution substantially contributed to this improvement.

Boiling-house work gave results considerably inferior to the customary standard. In all districts the recovery and coefficient of work were low, whilst the undetermined loss was high. This was most marked in the Central district, where extraordinarily high juice purities were encountered for a considerable proportion of the season. The average purity of the first expressed juice for this district was 91.52—1.41 units higher than that of 1941. Observations suggested that these high purities were due to the presence of dextro-rotatory non-sucrose bodies in the cane, and so the quality of the raw material entering the factory was unduly inflated. Associated with this occurrence were boiling difficulties in the pan stage as the result of a formation of a closely adherent scale on the heating surface. This prevented the heavying-up of the massecuites to a satisfactory brix, with consequent poor exhaustion. In several factories in the Southern district, but to a much smaller degree, similar troubles were experienced. In addition, at many mills the crushing was disorganised by irregular cane supplies, and in several instances two-shift operation had to be adopted. This resulted in further losses which helped to increase the undetermined value.

As would be expected, the quantity of fuel consumed per ton of cane increased considerably, and in spite of the greater quantity of bagasse resulting from the higher fibre in cane the extra fuel was appreciably greater than in the previous year.

FIGURES FOR 1942 SEASON.

	Northern.	Central.	Southern.	Totals and Averages.
Tons cane crushed	1,963,175*	1,631,976*	755,491*	4,350,642*
Tons sugar made (94 n.t.) ..	264,142*	240,225*	101,248*	605,596*†
Net titre	97.20	97.34	97.39	97.29
Tons of cane per ton 94 n.t. sugar	7.43*	6.79*	7.46*	7.18*
C.C.S. in cane	13.93	15.16	13.73	14.36
Coefficient of work	97.95	96.36	97.73	97.24
Crushing rate	71.92	61.47	40.80	55.93
Lost time per cent.	5.45	11.60	9.88	9.26
Fibre, per cent. cane	9.89	12.24	13.85	11.76
Pol, per cent. cane	15.06	16.09	14.96	15.44
First expressed juice—				
Brix	19.89	21.18	20.95	20.65
Purity	89.00	91.52	88.01	89.76
Clarified juice—				
Brix	15.71	15.05	15.33	15.36
Purity	88.91	90.51	87.36	89.18
Syrup—				
Brix	68.46	69.78	66.50	68.52
Purity	88.92	90.69	87.29	89.23
Last expressed juice—				
Purity	75.87	79.68	75.44	77.27
Clarified juice per 100 cane ..	102.97	112.44	106.34	107.40
Dilution per cent, first expressed juice	26.61	40.73	36.66	34.44
Final bagasse—				
Pol	2.67	2.69	2.22	2.57
Dry substance	51.34	49.88	51.43	50.78
Pol extraction	96.34	95.60	95.76	95.88
Lost cane juice per cent. fibre	37.00	34.32	28.94	33.98
Final molasses				
Gallons per ton cane	4.16	3.96	4.82	4.24
Brix	85.05	86.38	89.29	86.63
Apparent purity	32.85	33.89	38.39	36.42
True purity	47.41	46.58	46.32	46.88
Reducing sugars	17.31	13.31	12.06	14.58
Final mud—				
Tons per 100 tons cane	3.01	4.16	3.53	3.56
Pol	4.32	1.75	2.69	2.82
Sugar—				
Pol	98.587	98.721	98.859	98.696
Reducing sugars	488	397	176	379
Ash	180	197	259	205
Moisture	357	302	271	315
Dilution indicator	33.81	30.91	31.15	31.85
Pol, balance—				
Sugar (recovery)	86.64	84.60	85.44	85.81
Bagasse	3.66	4.40	4.24	4.12
Molasses	4.98	5.35	7.28	5.65
Mud	8.6	4.0	6.3	6.6
Undetermined	3.86	5.25	2.41	3.78
Boiling house efficiency ..	94.56	91.89	94.32	93.81
Fuel—				
B.T.U.'s 1,000s. per ton cane—				
Wood	97.90	75.13	133.42	95.62
Coal	1.53	3.70	35.14	9.90
Molasses	163.57	9.24	..	63.90
Bagasse	1,950.15	2,411.43	2,697.97	2,311.30
Total	2,213.00	2,490.50	2,866.53	2,480.72
Crop days	1,781*	1,568*	1,083*	4,432*

* All Mills. Remainder except C.S.R., Pioneer, Inkerman, and Eagleby Mills.

† The total sugar produced is less than the sum of the district totals by 19 tons. This quantity was lost in storage but the Bureau has not been advised as to the allocation of this loss to the individual mills.

CANE MILLED AND SUGAR YIELD, SEASON 1942.

Mill.	Tons Cane Crushed.	Tons 94 n.t. Sugar Made.	Tons Cane per Ton 94 n.t. Sugar.	
			1942.	1941.
Mossman	102,033	13,873	7-355	6-492
Hambledon	175,198	23,350	7-503	6-653
Mulgrave	199,616	27,306	7-310	6-682
Babinda	214,561	28,893	7-426	6-903
Goondi	195,412	25,768	7-584	6-819
South Johnstone	238,673	32,974	7-238	6-758
Mourilyan	162,832	22,063	7-380	6-851
Tully	240,042	32,980	7-278	6-657
Victoria	233,103	30,219	7-714	6-870
Macknade	201,705	26,643	7-571	6-718
Sugar—Local Sales	..	73	..	..
Total for Northern District	1,063,175	264,142	7-432	6-744
Invicta	80,733	11,971	6-744	6-436
Pioneer	175,763	27,276	6-444	6-238
Kalamia	180,100	23,106	6-408	6-358
Inkerman	215,426	31,773	6-780	6-438
Proserpine	136,887	20,556	6-659	6-855
Cattle Creek	69,329	10,012	6-924	7-200
Racecourse	157,382	22,293	7-060	7-110
Farleigh	140,180	19,753	7-097	6-939
North Eton	78,405	10,764	7-284	7-396
Marian	139,924	20,584	6-798	6-794
Pleystowe	122,088	17,767	6-872	6-750
Plane Creek	135,759	19,177	7-079	6-969
Sugar—Local Sales	..	193	..	..
Total for Central District	1,631,976	240,225	6-794	6-736
Qunaba	76,346	9,873	7-733	7-399
Millaquin	135,107	18,147	7-445	7-410
Bingera	133,381	19,002	7-019	7-323
Fairymead	105,221	13,306	7-908	7-913
Gin Gin	22,056	2,784	7-922	8-256
Isis	110,217	15,443	7-137	6-951
Maryborough	50,285	6,680	7-528	7-422
Mount Bauple	16,701	2,133	7-830	7-795
Moreton	95,181	12,526	7-599	7-677
Rocky Point	10,996	1,301	8-452	8-747
Eagleby	..	..	..	..
Sugar—Local Sales	..	53	..	..
Total for Southern District	755,491	101,248	7-460	7-475

For various reasons, during 1942 crushing season, quantities of cane assigned to certain mills were crushed by neighbouring mills, and for official purposes the sugar produced from these quantities of cane must be credited to the mills to which the cane was assigned. The above table, however, gives the actual tonnages handled by the mills, and the production figures must therefore be adjusted wherever necessary to give for each mill the sugar officially produced.

This has been done in the following table:—

Mill.	Tons. 94 n.t.	Mill.	Tons. 94 n.t.
Mossman	13,873	Marian	20,541
Hambledon	23,350	North Eton	10,772
Mulgrave	27,446	Cattle Creek	9,730
Babinda	28,865	Pleystowe	20,517
Goondi	25,566	Plane Creek	19,177
Mourilyan	22,309	Isis	14,000
South Johnstone	32,728	Gin Gin	1,877
Tully	32,980	Qunaba	9,873
Victoria	29,800	Millaquin	18,202
Macknade	27,049	Bingera	19,908
Invicta	11,984	Fairymead	14,770
Pioneer	27,276	Maryborough	6,600
Kalamia	25,106	Mount Bauple	2,138
Inkerman	31,773	Moreton	12,526
Proserpine	20,211	Rocky Point	1,262
Farleigh	18,602	Eagleby	38
Racecourse	21,357	Local Sales	319
		Less—Lost in Storage	19
			605,596

	Season.	Pol in Cane.	Fibre in Cane.	Purity 1st Exp'd. Juice.
		Per Cent.	Per Cent.	Per Cent.
Southern District ..	1933	13-55	15-21	87-65
	1934	14-67	14-59	89-74
	1935	14-56	14-47	88-60
	1936	15-31	14-32	88-83
	1937	15-05	14-04	88-14
	1938	14-62	13-66	88-87
	1939	14-88	13-70	88-46
	1940	15-42	13-40	87-69
	1941	14-76	12-93	87-94
	1942	14-06	13-85	88-01
Central District ..	1933	15-40	12-25	90-84
	1934	16-45	12-20	90-82
	1935	16-54	12-36	90-75
	1936	16-43	11-84	90-91
	1937	16-62	10-96	90-06
	1938	16-70	11-55	91-58
	1939	16-33	11-39	90-43
	1940	16-34	11-52	90-54
	1941	15-86	11-54	90-11
	1942	16-09	12-24	91-52
Northern District ..	1933	14-92	10-27	88-84
	1934	15-16	10-30	89-03
	1935	15-01	11-35	89-63
	1936	15-01	9-92	87-92
	1937	16-14	10-12	89-79
	1938	15-74	10-17	89-95
	1939	16-18	9-84	90-30
	1940	16-26	9-89	90-45
	1941	16-27	9-71	90-01
	1942	15-06	9-89	89-00
All Districts ..	1933	14-85	12-00	89-40
	1934	15-57	12-23	89-95
	1935	15-84	12-39	89-83
	1936	15-66	11-63	89-36
	1937	16-15	11-17	89-61
	1938	15-84	11-63	90-32
	1939	15-88	11-56	89-85
	1940	16-04	11-58	89-65
	1941	15-70	11-29	89-47
	1942	15-44	11-76	89-76

TONS OF CANE PER TON OF 94 N.T. SUGAR.

1930.	1931.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.
6-83	6-94	6-90	7-31	6-97	6-92	6-94	6-73	6-87	6-77	6-82	6-87	7-18

AVERAGE CRUSHING RATES (TONS CANE PER HOUR).

1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.
50-80	54-83	55-73	60-80	61-53	61-67	63-32	55-93

SOUTHERN DISTRICT.

	1936.	1937.	1938.	1939.	1940.	1941.	1942.
Tons of cane	794,390	647,220	1,035,992	1,262,554	1,217,278	1,006,149	755,491
Tons of 94 n.t. sugar	109,142	85,131	135,261	168,896	169,232	134,603	101,248
Tons of cane per ton 94 n.t. sugar	7-23	7-60	7-66	7-48	7-19	7-43	7-46
Pol in cane	15-31	15-05	14-62	14-88	15-42	14-76	14-96
Fibre in cane	14-32	14-04	13-66	13-70	13-40	12-93	13-85
Purity—							
First expressed juice	88-83	88-14	88-87	88-46	87-69	87-94	88-01
Clarified juice	87-57	87-23	88-07	87-80	86-91	87-05	87-36
Syrup	87-97	87-42	88-33	88-22	87-28	87-30	87-29
Gallons molasses per ton cane	4-36	4-91	4-13	4-13	4-56	4-54	4-82
Apparent purity final molasses	40-07	41-23	39-05	38-79	37-42	36-77	38-39
Overall recovery	85-98	83-83	85-46	86-17	86-44	86-86	85-44
Recovery on mixed juice	90-64	87-81	89-82	90-08	90-27	90-31	89-22
Boiling-house efficiency	95-41	92-82	94-55	95-02	95-63	95-57	94-32

CENTRAL DISTRICT.

	1936.	1937.	1938.	1939.	1940.	1941.	1942.
Tons of cane	1,966,183	1,961,413	2,030,166	2,397,268	1,891,399	1,724,922	1,631,976
Tons of 94 n.t. sugar	301,893	304,502	314,574	371,259	280,777	256,923	240,225
Tons of cane per ton 94 n.t. sugar	6.51	6.44	6.45	6.46	6.74	6.71	6.79
Pol in cane	16.43	16.62	16.70	16.33	16.34	15.86	16.09
Fibre in cane	11.84	10.96	11.55	11.39	11.52	11.54	12.24
Purity—							
First expressed juice	90.91	90.06	91.58	90.43	90.54	90.11	91.52
Clarified juice	90.25	89.55	90.77	89.97	90.04	89.54	90.51
Syrup	90.54	89.84	91.04	90.33	90.14	88.87	90.69
Gallons molasses per ton cane	3.71	4.13	3.72	3.96	4.03	4.12	3.96
Apparent purity final molasses	37.22	35.93	37.85	35.33	35.40	35.53	38.89
Overall recovery	88.62	89.00	88.72	86.93	87.80	88.25	84.90
Recovery on mixed juice	93.20	93.25	92.70	91.20	92.19	92.23	88.49
Boiling-house efficiency	97.08	97.54	96.26	95.20	96.23	96.47	91.89

NORTHERN DISTRICT.

	1936.	1937.	1938.	1939.	1940.	1941.	1942.
Tons of cane	2,410,638	2,524,301	2,275,927	2,378,999	2,072,079	2,062,518	1,963,175
Tons of 94 n.t. sugar	333,613	373,692	328,301	351,267	309,437	305,819	264,142
Tons of cane per ton 94 n.t. sugar	7.23	6.76	6.93	6.77	6.70	6.74	7.43
Pol in cane	15.01	16.14	15.74	16.18	16.26	16.27	15.06
Fibre in cane	9.92	10.12	10.17	9.84	9.89	9.71	9.89
Purity—							
First expressed juice	87.92	89.79	89.95	90.30	90.45	90.01	89.00
Clarified juice	88.59	90.29	90.07	90.54	90.63	90.18	88.91
Syrup	88.58	89.85	90.89	90.40	90.73	89.90	88.92
Gallons molasses per ton cane	3.94	3.51	3.99	3.56	3.62	3.89	4.16
Apparent purity final molasses	31.66	34.62	34.38	35.81	36.20	35.32	32.85
Overall recovery	88.10	88.01	87.50	86.88	87.67	87.40	86.64
Recovery on mixed juice	92.58	92.44	92.53	91.15	91.69	91.28	89.93
Boiling-house efficiency	97.97	96.80	96.89	95.25	95.71	95.48	94.56

ALL QUEENSLAND DISTRICTS.

	1936.	1937.	1938.	1939.	1940.	1941.	1942.
Tons of cane	5,171,211	5,132,934	5,342,085	6,038,821	5,180,756	4,793,589	4,350,642
Tons of 94 n.t. sugar	744,648	763,325	778,136	891,422	759,446	697,345	605,596
Tons of cane per ton 94 n.t. sugar	6.94	6.73	6.87	6.77	6.82	6.87	7.18
Pol in cane	15.66	16.15	15.84	15.88	16.04	15.70	15.44
Fibre in cane	11.63	11.17	11.63	11.56	11.58	11.29	11.76
Purity—							
First expressed juice	89.36	89.61	90.32	89.85	89.65	89.47	89.76
Clarified juice	89.07	89.44	89.83	89.43	89.28	89.08	89.18
Syrup	89.27	89.41	90.29	89.77	89.46	88.80	89.23
Gallons molasses per ton cane	3.96	4.02	3.54	3.83	4.06	4.16	4.24
Apparent purity final molasses	35.54	36.62	37.08	36.51	36.39	35.83	36.42
Overall recovery	87.90	87.79	87.52	86.70	87.34	87.66	85.81
Recovery on mixed juice	92.52	92.20	92.01	90.94	91.49	91.54	89.50
Boiling-house efficiency	97.18	96.65	96.14	95.23	95.90	96.06	93.81
Pol extraction	95.01	95.22	95.12	95.34	95.46	95.76	95.88
C.C.S. in cane	14.52	15.00	14.79	14.77	14.90	14.58	14.36
Coefficient of work	99.37	98.98	98.17	99.16	98.24	98.90	97.24

	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.
Crop days	4,382	4,296	4,809	4,497	4,822	5,163	4,558	4,034	4,432

Price: 9d.]

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